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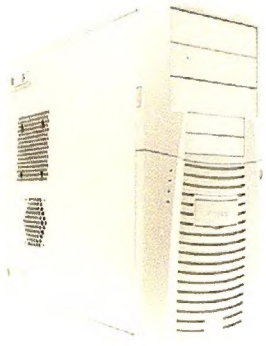

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Case Colour	Beige	Black	Black	Antec Metallic Gray
Case Dimensions	43.8 (H) x 20.5 (W) x 47.2 (D) cm	43.8 (H) x 20.5 (W) x 47.2 (D) cm	52.3 (H) x 20.6 (W) x 47.2 (D) cm	52.3 (H) x 20.6 (W) x 47.2 (D) cm
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Drive Bays	8	8	10	10
Cooling Capacity				
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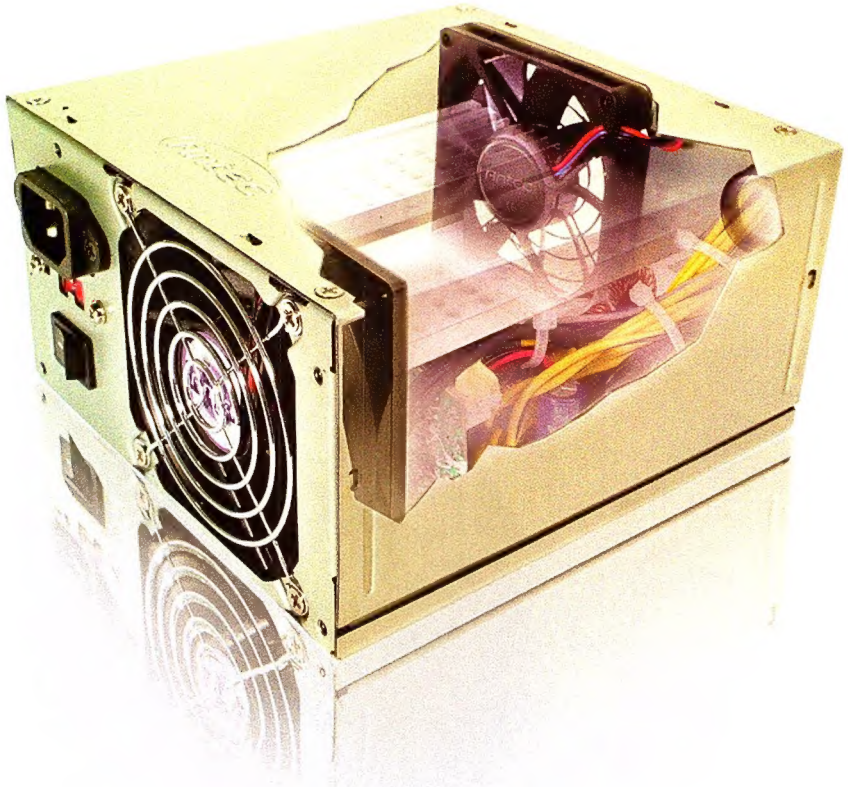

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Geek Inside

Atomic has always been more than just a mag. It's even more than a carefully conceived designer drug, a monthly tech fix the geek junkie within you craves...

Every person has an inner geek/geekette. It's that part of you that yearns to create, dive into and play with *anything*. It's core to the pleasure of exploration. We recognise this, and so do you. You know that when someone says they read *Atomic* that they're on the same level as you.

Which is why if there's one thing we do, it's listen to you guys.

The cover CD, aka the freebie frisbee, is one topic we've been listening to closely. We take pride in giving you different kinds of Atomic goodness, but you have told us that more *Atomic* pages is where it's at, that it's our core content that sets *Atomic* apart as the cream of tech mags.

So we've taken your input to heart. We've returned to the days before we introduced the CD. It doesn't mean you won't see it again – we'll bring it back for exclusives and special occasions – but from now on we're taking those resources and putting them into pages for the mag, each and every month.

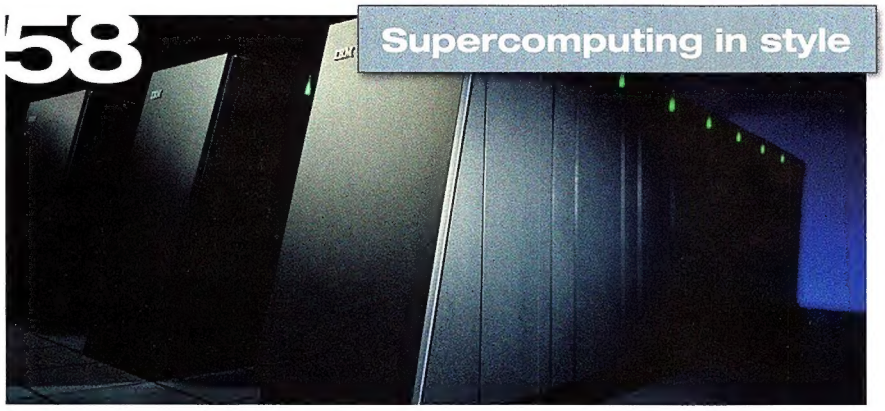
Atomic is now 32 pages larger that it was this time last year. It's bigger than it's ever been before. And it means we can give you more of what you love each month. You'll already see some additions these extra pages bring right here in this issue!

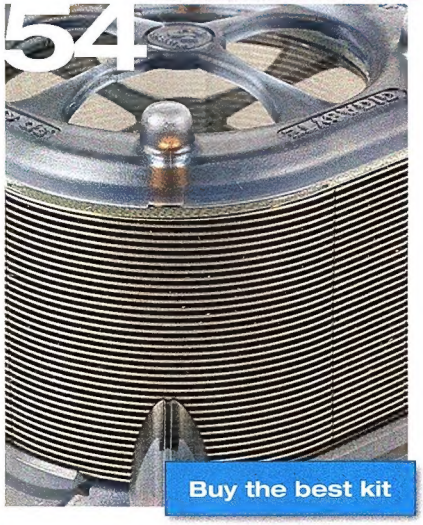
On another note – if there's no CD, then where is the Green Code for that super sexy *Atomic* website access? Not a problem: check the subscriber card insert on *page 98*, and on the back you'll find the code. While you're at it, if you're not currently a subscriber, fill it out and send it in so you don't even have to brave sunlight and go *outside* to get your monthly fix. Heck, that's why we invented the interweb isn't it?

So have a look at this new issue and tell us what you think. We listen. And remember, look after your inner geek.

Ashton Mills
amills@atomicmpc.com.au

LOOKING FOR YOUR GF





EN CODE? SEE PAGE 98

this month

FEATURE

You need ridiculous amounts of processing power, and we have the answers. Construct your own super-computing demon from anything with **Leigh Dyer**.

058

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update

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Samsung joins the fuss bus

Logan Booker looks at why Rambus likes suing stuff – especially Samsung.

In what is becoming a surprisingly common event these days, Rambus has decided to sue Samsung for allegedly infringing on its intellectual property.

If you weren't already aware, Rambus develops memory technologies and licenses them out to other companies – like Samsung. Lawsuits however are nothing new for Rambus, the Samsung case just one of many in a long string. According to Rambus, Samsung has trodden on a number of patents, including those it has for DDR and GDDR memory.

According to the press release on the suit, Rambus chief executive officer Harold Hughes said 'While we have regarded Samsung as a valuable licensee of our patents for certain applications, a number of issues now exist that have made the renewal and expansion of the Samsung SDRAM/DDR licence difficult.'

'These issues have caused us to terminate that licence ... [however] We continue to value our relationship with Samsung as one of the primary manufactures of memory using our XDR-DRAM and RDRAM designs. We very much hope that there is an opportunity in the near future to normalise all other aspects of our relationship as well,' he said.

Ever since Rambus went after Hitachi for the same thing back in 2000, the company has filed suits against Hynix, Infineon and countless others in an attempt to protect its intellectual property. And, of course, it's hard to forget the scrap between Rambus and Intel when RDRAM was first put forward as the memory standard of the future. After sinking some US$1 billion in Rambus and RDRAM, Intel really didn't get terribly much from the deal, other than a hole in its pocket and pie on its face. The whole ordeal however did keep the alternative, SDRAM, in the market for quite some time, long enough to pave the way for its successor – DDR-RAM.

Although Rambus has fallen by the wayside in the eyes of consumers since the extinction of RDRAM for the Intel platform just over two years ago, it's been working hard on a number of projects in other spaces. For instance, Sony's Playstation 3 will feature 256MB of Rambus' XDR-DRAM, also known by the codename 'Yellowstone'. XDR-DRAM is almost godly compared to current generation DDRRAM, with a typical component capable of running at 3.2GHz or more.

In other words, Rambus is hoping for a nice settlement, one that Samsung will more than likely provide. Samsung can't afford to have lingering trouble with Rambus, if it wants to manufacture the XDR-DRAM for the PS3.

"According to Rambus, Samsung has trodden on a number of patents..."

THEN & NOW

#002 Hard Drives

Storage in general actually, but the focus is hard drives. Everything from tapes, to disks so small you could lose them in your underpants. Let the lesson commence!

1950

Data cassettes

Say hello to the humble tape drive. One of the first conventional storage devices, tapes were used to hold everything from financial records to the latest hit from *Rodgers & Hammerstein*.

1955

IBM 305 RAMAC

Yes, IBM made the first hard drive, and yeah, it made them big back then. When the RAMAC was around, consuming the entire city power grid like a fat kid with a cheescake, the 'drive' could store a whopping 4.4MB of data on its array of 50 24-inch discs.

1970

Winchester 3340

Probably the first 'proper' hard drive, it got its name from the rifle of the same name. Packing a 30MB capacity and 30ms read time, the '30-30' moniker was a perfect fit.

XXX on top

ICANN has given the go-ahead for the .xxx domain, reports Logan Booker.

Porn is too big a business on the net these days to continue without a top-level domain. Hence, the Internet Corporation for Assigned Names and Numbers (ICANN) has approved the use of the '.xxx' domain for sites that meet (and comply) with certain guidelines set by the not-for-profit organisation. ICANN is responsible for regulating and implementing current and new domain extensions, however, it sometimes gets accused of censorship.

The .xxx top-level domain, along with making it easier to find the adult entertainment that suits your distorted tastes, pro-porn groups say it will make blocking such sites from children easier. The other side of the coin is that by supplying pornography and other adult sites with their own domain extension, ICANN is promoting pornography itself.

According to the original TLD (Top Level Domain) application, filed by ICM Registry, Inc: 'The online adult entertainment community is defined as those individuals, businesses, and entities that provide sexually-oriented information, services, or products intended for consenting adults or for the community itself.'

'Although some individuals may have personal or moral objections to the adult entertainment industry, statistics demonstrate unequivocally that sex is an integral part of the internet.'

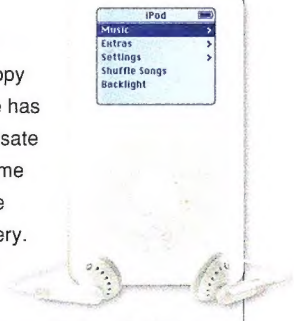
The application goes on to show the extent of the adult entertainment industry online and its influence on the internet. Specifically, that one in four websites visited in 2003 was adult-orientated and that the industry is predicted to be worth US$4.6 billion come 2006.

Other options for adult-orientated TLDs were '.porn' and '.sex'. .xxx won out as it provided a clearer delineation than .sex (which could be used for informational sites such as birth control and health), but was not as obtuse as .porn. Or .pr0n.

short circuits

Celebrations are in order for the University of Alberta in the States. Seems a group of researchers have managed to get a transistor made of a single molecule to work, furthering the creation of even smaller integrated circuits.

The single-molecule transistor joins the ranks of many other advances in miniaturisation, along with light beams, fluidics, magnets and carbon nanotubes. Yet, despite these recent discoveries, we're still waiting for something to replace traditional ICs made with silicon photolithography.



Two million iPods owners will be happy to learn that Apple has agreed to compensate them for the extreme uselessness of the MP3 player's battery. iPodders who can prove their player hasn't lasted as long as it should will be entitled to make a claim for a replacement, or receive credit on Apple products up to the value of $50. In addition, users who purchased an iPod in the last few years will get an extension of their warranties by a year.

Gamers will soon be asking themselves why they would buy a Game Boy, now that a fully-functional emulator is available for the Playstation Portable. It's not legal, of course, and if that wasn't enough, emulators for other consoles, including older 16-bit relics like NES and SNES, will be easily accessible for the classic-inclined. Make the bad man go away.

Quantum Fireball
During the 1990s the field of hard drive manufacturers was verdant pasture. Among the big companies (like IBM) were Quantum, Hitachi, Maxtor and Western Digital (and countless others). We haven't the space to stick them all in here, so this picture of a 30GB Fireball will have to do. Sufficed to say, both PATA and SCSI drives were doing good business at this time.

...and that's another Then and Now. Tune in next month when we follow the escapades of some other technical wonder (but not gerbils).

1990 2000 2005

Seagate Barracuda 7200.8
The 2000s have been good to capacities, prices and speeds. 120GB are pretty much standard, and it won't be long before 200GB, and even 400GB drives are everywhere. One terabyte awaits.

IBM Microdrive
Drives have continued to shrink in size, as this image demonstrates. With new storage technologies on the horizon, expect drives to get smaller in dimensions, larger capacity-wise and loads faster. Win.

short circuits

Not wanting miss out on a piece of the P2P pie, or any pie for that matter, Microsoft has been developing its own peer to peer file sharing system with a particular emphasis at trumping BitTorrent. The new system, codenamed Avalanche, is reported to be 20-30 percent faster than similar P2P software. Microsoft is quick to stress the technology should be used only for the distribution of legitimate files, naturally.

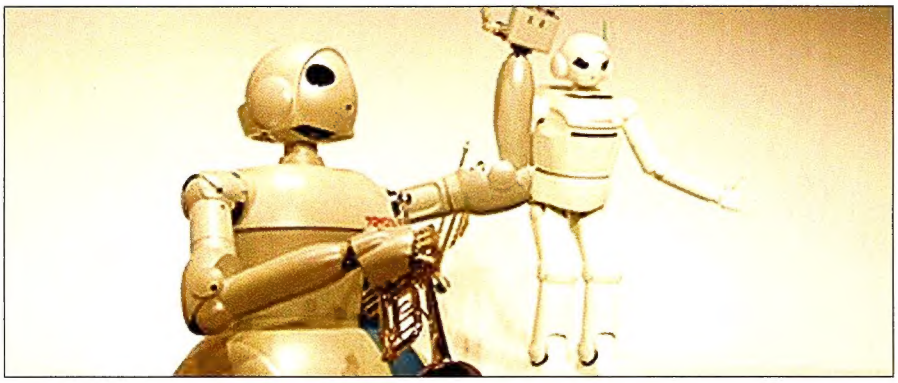
Gentoo founder, chief architect and generally all round nice guy Daniel Robbins recently finalised handing over all Gentoo's intellectual property to the non-profit Gentoo Foundation, seemingly to forego the trappings of open source to take up a new job at... Microsoft. In his own words his new role will be 'helping Microsoft to understand open source and community-based projects.'
Good-luck Daniel.

TOP 5 ...most broken classes in World of Warcraft

5. Druids. Rogue, warrior, mage and healer? Stop whining you pansies.
4. Priest. Fear + Shadowform. 'Nuff said.
3. Paladins. I have a big hammer and plate armour and healing and invulnerability. STFU.
2. Rogues. Stealth and stun lock for the win.
1. Shamans. More abundant than farts at a bean-eating contest. Healing, stuns, shocks and procs? Broken as broken is.

future proof

Quenching your thirst for the latest technology and hardware



Awakening the machine

Nathan Davis hands over his flesh in the name of bliss.

It's not like you really need to be told, but computers are growing more powerful all the time. It's a fact. No longer is this through the occasional frequency bump, but more so through features. Features such as multithreading abilities – whether via HyperThreading or the more recent hardware-flavoured route with multiple cores – more cache, increased memory addressing as seen on 64-bit chips, and a growing list of others. So increments in performance through upping the frequency has taken a back seat for now with all of these developments on features now in the lime light. As a result, we're seeing manifestations of some really intriguing concepts.

Field Programmable Gate Array (FPGA) chips are not a new concept, as their programmable circuits make a great platform in designing new chips. However the final chips are hard-wired. If all goes well, we may soon see FPGA silicon making an appearance on our calculators, as some Scottish researchers are building a supercomputer made from such chips. This means it's essentially a self-programmable machine, capable of reconfiguring its processors for specific tasks.

In terms of machines doing things for themselves, there are developments on a robot that can self-replicate and speed the process up of prototyping. With the ability to print circuit boards, it's envisaged to one day be able to pave way for a home-based recycling station where it's fed materials, it breaks them down and creates whatever the feeder wishes. What's more, the developer (**staff.bath.ac.uk/ensab**) plans to make the software behind it open source.

I don't know about you, but I want my R2-class 'hack-the-Gibson' Astromech, T800 'he'll-live balance-buddy' and personal NS5 'lifestyle assistant' (hey, no, just don't go there). Of course, that isn't possible, but their low-profile predecessors are already here and doing a mighty fine job.

Beyond rumour now, from iRobot, the Roomba robotic vacuum cleaner we fell in love with several months back now has a companion on its way. Dubbed the 'Scooba' (**irobot.com/consumer/scooba_sneak_preview.cfm**), it moistens, mops and dries the floor. There's even a robotic lawn mower on the market called 'Robomow' (**friendlyrobotics.com/robomow.htm**) to keep the garden neat and trim (though it doesn't yet facilitate my want for a 'concrete over garden' option).

These are all quite simple in operation, but it's a start. And we're not complaining, as they all help in their own individual way at doing things we plain don't want to. By 2010, Toyota plan on unleashing an army of 'Partner Robots' (**toyota.co.jp/en/special/robot**), most of which finally have legs.

Perhaps someday soon we'll be forever vegged out on a couch, immersed in a virtual world with robots swatting the flies, re-filling our feeding tubes and taking out the garbage. Of course, they'll probably be feeding off our blood for electricity and our young 'uns will be born and kept in capsules for easy access and maintenance, but we're cool with that.

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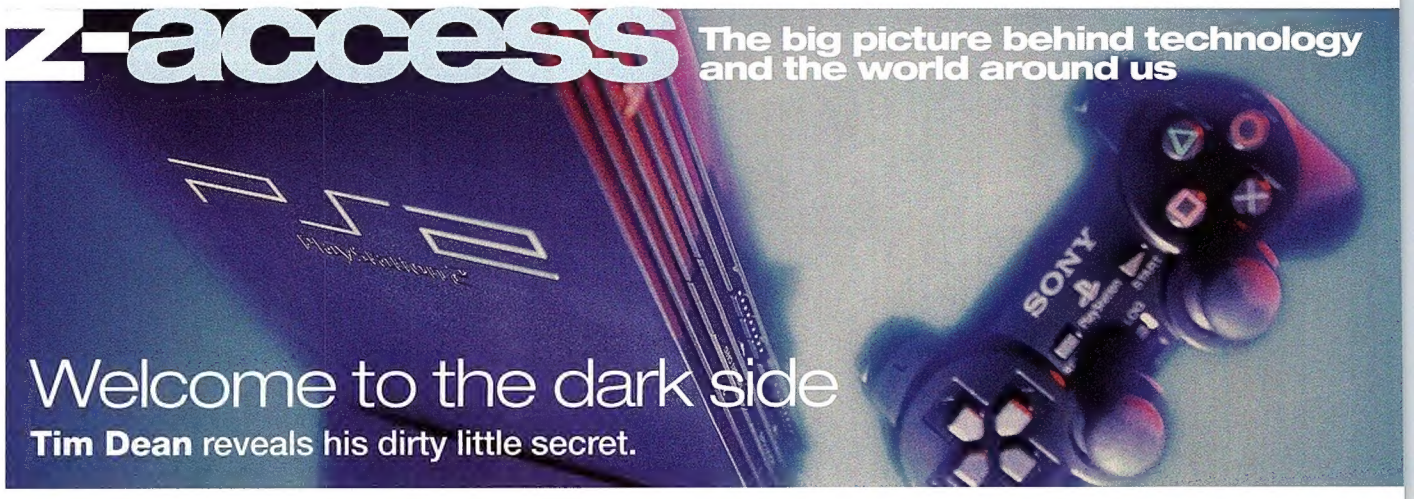
The big picture behind technology and the world around us



Welcome to the dark side

Tim Dean reveals his dirty little secret.

Well, I've finally done it. I have a guilty secret to confess. No, I haven't gone completely clean-shaven (although the goatee did go several months ago – I'll have to get Ashton to update my photo).

No, I've done another thing that only months ago I would have thought unthinkable – if that statement makes sense. What have I done? I bought a PS 2.

Hi, my name's Tim, and I'm a console owner.

I feel like I should be saying that to a group of dishevelled individuals sitting in a small room on old plastic school chairs, and have them welcome me with a resigned, but desperately hopeful, 'Hi Tim.' in return.

Having said that, it's not like it's the first time I've opened my door to a console, or even allowed one to couple with my telly. In fact, it's only my current lack of PS2-packing flatmate that has forced me to swallow my pride and fork out for my own. Still, I haven't told my PC yet – I just don't know how it'll take the news.

And I blame Gran Turismo 4. Or more accurately, I blame the fact that GT4 has a Datsun 240Z in it, not unlike my own unfortunate example (or ex-example, as some fiendish miscreant pilfered it late last year – broke my heart and caused my wallet to jump for joy in a single stroke).

GT4 – the game in which you can do anything imaginable that involves cars, besides reverse park or shag in the back seat. Then again, I haven't completed all the advanced licence tests yet, so I wouldn't be surprised if the former makes an appearance. And there's probably some code to unlock the latter too.

Given GT4's clear supremacy over all other driving games, I simply had to own it. I also learned some time ago that shaking my fist at the heavens and complaining about injustice will do nothing to make GT4 appear on PC. So the path was clear.

Still, it's undoubtedly a strange time to buy a new console, given the next generation is just around the corner. Then again, it probably is the last chance to buy a simple games console that does nothing more than allow you to blow the crap out of stuff on your TV. The next generation consoles will very likely be entire home entertainment devices, with TV, PVR, DVD and internet functionality all bundled in.

I'm only talking about the Playstation 3 and Xbox 360 though, not the Nintendo Revolution. No-one really knows what the Revolution will be, except that Nintendo expects it to be 'revolutionary'. Hey, if Nintendo carved it out of a turnip and gave you a stylus, that would be revolutionary, but it doesn't mean it's going to be any better than the PS3 or Xbox 360. If Nintendo actually knew what the hell it was doing, then it would have said something months before E3, so I think the turnip theory could actually be close to the mark. And no, I will not reveal the sources for the turnip hypothesis.

So, I only really expect to get about 18 months out of my PS2, and probably only play three or four games on it. Grand Theft Auto: San Andreas comes to mind.

When the next generation consoles hit, I won't be nearly as recalcitrant in my plans to embrace them. Heck, if they really do have a PVR, digital TV, High-Definition support and I can play games on them, then why wouldn't I? Even better if I could connect it to my PC and stream audio, or access the internet over wireless instead of via a direct broadband connection.

Still, I'll continue to maintain my preference for PC gaming over console gaming in most cases for the foreseeable future. This is simply a result of my preference for more complex games, which generally require more powerful interfaces, and the PC's inherent versatility will always give it an advantage in this area. Hey, I'm not dissing anyone who doesn't agree, or who prefers console games to PC, or even likes them both equally. I'm cool with that. I really am.

So until the next gen arrive, I'll content myself with my PC, punctuated by some manic lap pacing in my 240Z, or perhaps my Ford GT40 from time to time. Seems a healthy balance.

Goatee or no? Tim wants your hair care tips!

tim@atomicmpc.com.au

> **Hey, if Nintendo carved it out of a turnip and gave you a stylus, that would be revolutionary, but it doesn't mean it's going to be any better than the PS3 or Xbox 360.**

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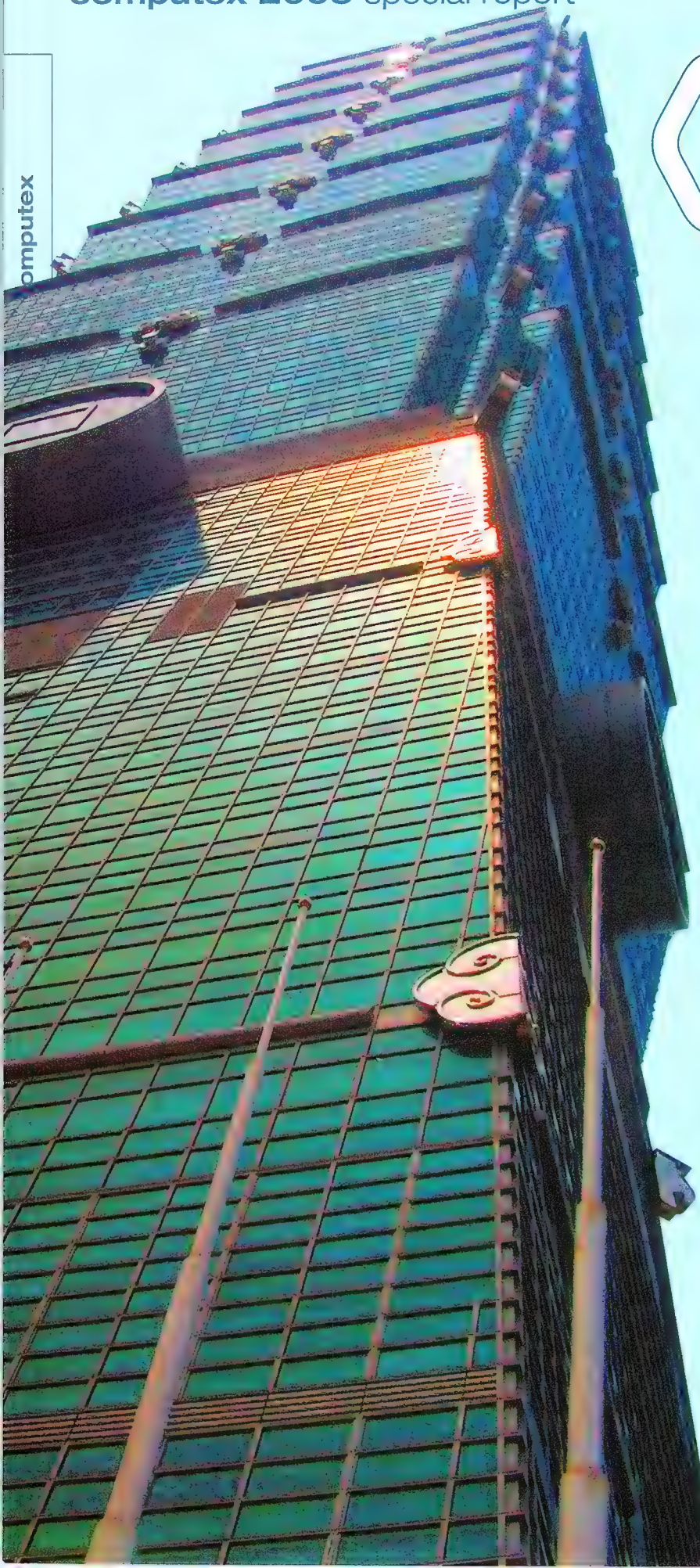


COMP

Situated around Taipei 101, the world's tallest building, this year's Computex saw over one thousand exhibitors come to demonstrate the best in tech. And this is what we found.

by **Ashton Mills**

Taipei is an experience. From from the taxi driver who managed to burp almost consistently for fourty minutes during the ride from Chiang Kai-Shek airport, to the bustling technopolis at the city center, I knew I was going to feel right at home here.

And there are few places as fitting as Taipei for the world's second largest exhibition of technology, behind Germany's CeBit. Here, the sides of buildings are adorned with skyskraper sized advertisments proclaiming 'GIGABYTE – POWER YOUR GAMING WORLD' or showing images of suave young professionals draped over the smooth lines of a Shuttle XPC. In Australia, most of the population would look quizzically at such advertising. Here, tech is cool.

Granted, it's Computex, but when a city has its own street based computer market, where vendors trade cards and cases instead of fruit and vegetables, you know you're in a city that lives by and thrives on technology. Fantastic!

It's the perfect place to showcase the up and coming technologies and products we'll all be using soon, and to learn just what the future holds in for beloved industry.

The usual suspects

Spread over almost 59,000 square meters, Computex is big. Over a thousands exhibitors came to showcase their latest and greatest, and none more so than the big players. As always Intel, AMD, NVIDIA, and ATI were here in force.

I doubt the intention was one-upmanship, but just in case AMD put a formula 1 racing car on display amongst its booth babes. ATI hired a troupe of sexy young girls to walk around Computex in tight AMD branded skirts and tops all day, every day, just to spread the word. And NVIDIA had a legion of girls dresssed as their aluring siren putting on shows that frequently drew massive crowds clamoring for some attention. Or at least, freebies.

Walking the floor is like another world. Every name you know, and every name you don't know, vying for

JTEX 2005

your attention. Just to be here for some is an achievement.

The booths and stalls are populated with CPUs, motherboards, graphics cards, memory, cases, cooling, gadgets, and new innovations greeting you at every turn. It's like being a kid in a candy store.

So what new sweets are coming this year?

It was exactly a year ago at last year's Computex that AMD officially unveiled Socket 939. This year, AMD officially launched the dual-core X2 platform. Naturally, there were socket 939 Athlon 64 X2 capable motherboards on show from just about every motherboard manufacturer in the market, from ASUS and DFi through to MSI and Epox. Most of these were sumptious new designs, adding a bevvy of features to strengthen the deal.

Similarly, there were equal number of Intel 955X based motherboards on show, signalling that 64-bit and dual-core capable platforms are soon to be the new black.

Just as NVIDIA and ATI were promoting their PCI Express solutions last year, this year both were touting the benefits of their SLI technology – yep, you read right: ATI has come to the party and gone head to head with NVIDIA on their own turf, using Computex to officially reveal its new CrossFire dual-card graphics subsystem.

CrossFire hearkens back to the original Voodoo SLI days more than NVIDIA's dual video card implementation: there's no bridge between cards, but rather a special cable that links one card to the other externally, with the output cable to the monitor attached as part of this. There are other key differences as well – unlike NVIDIA's SLI which requires profiles to be defined for each game to run in SLI, ATI claims CrossFire will work with *all* games without the need for any fiddling. Nice. However, unlike SLI where any two video cards of the same chipset can be used, Crossfire requires one of the video cards to be a special 'CrossFire enabled' version. For instance, if you want to use two X850 XT cards you need a standard X850 XT and a CrossDire X850 XT.

Naturally, ATI claims better speeds and a number of vendors were demonstrating CrossFire enabled boards based on the ATI RD 400 (Intel) and ATI RD 480 (AMD) chipsets, including a rather impressive setup from DFI.

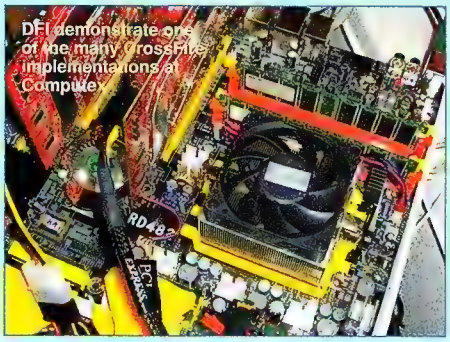
By the time you read this CrossFire based motherboards and cards should be available, and you can bet we're panting at the bit to get our first sample in to see how it all stacks up vs NVIDIA's SLI.

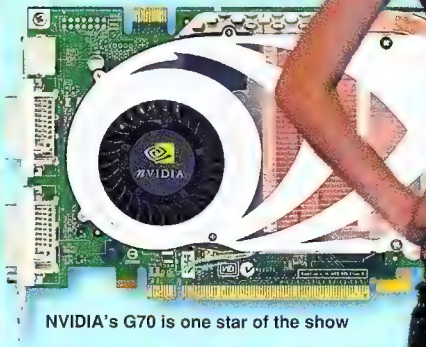
New light

Perhaps trying to steal ATI's thunder, NVIDIA unveiled its next generation GPU – the 7800, otherwise known as the G70. Lets be clear here: this card is hot. Not just because it's a superseding offering from NVIDIA, but because it aims to deliver on a greater promise of both frames and image quality.

The G70 features 8 vertex and 24 pixel pipes, has been optimised to execute commonly used shader functions faster than previous generations. and includes new features such as extra sampling for alpha channels, to help reduce jaggies on textures using transparency. Expect it here in July, and costing near to $1000 as new GPU releases often do.

See *page 47* in this issue for our first look at this tasty new card.





NVIDIA's G70 is one star of the show

Computex is as famous for its booth babes as it is for showcasing technology. This year's show was no different, wtih scantily clad girls patrolling outside, inside, and at almost every stand to lure the predominantly male crowd to ogle both booth babe and product alike.

Two is always better than one – The ASUS EN6800 Ultra Dual and MSI's dual nx6800 Ultra smack two 6800 Ultra GPUs onto a single card. Either would make a geek proud, but MSI's card has the edge fitting on twice as much DDR3 and doing it all as a single slot solution. These are cards worth fantasising over.

Double trouble

Making a popular appearance this year are a range of dual-GPU cards from some of the major vendors in the industry – Gigabyte (naturally), ASUS, and MSI.

Gigabyte pioneered the original dual-GPUs on a single card with the 3D1, and at Computex they were demonstrating its next incarnation, the GV-3D1-6800GT. Featuring two 6800GTs with 512MB total onboard DDR3, and a very impressive all copper cooler, the card would be sweet if not for the fact I've since been told by Gigabyte that it won't enter production – we gather they're going to focus on G70 releases and push these to market rather than cover old ground.

ASUS were happy to show off their dual-GPU solution, claiming it as the fastest, and possibly the biggest, card on show – the EN6800Ultra, as the name suggests, smacks on two 6800 Ultras with a total of 512MB DDR3, and huge copper and fan heatsink cooling solution. The card takes up two slots, and isn't the type of thing you'll be able to squeeze into a SFF PC. Or your car, by the looks of it. It's huge.

However the award for the baddest mofo card of doom must go to MSI's dual-GPU card, the nx6800ultra. Check the specs: Two 6800 Ultras, *1GB* total onboard DDR3, double-sided copper based heatsink plus heatpipe cooling solution, and all in a *single slot card*. But wait, there's more – unlike the Gigabyte and ASUS offerings, the SLI connector is retained.

Now, granted, drivers will likely have to support this, but conceiveably two of these cards could be SLIed to give you quad-GPU exctasy.

While tantalising, as with Gigabyte, chances are many vendors are going to focus on G70 releases from here on in, so again don't be surprised if many of the dual-GPU cards don't make it to Australia.

i-think therefore i-RAM

Computex wasn't all 'bigger is better', indeed there were quite a few innovative new inventions to be found, not the least of which was Gigabyte's i-RAM.

The premise is simple – a plug in PCI card with four DIMM slots that connect and appear to the system as a SATA drive. It is, effectively, a RAM drive on the cheap. And there are a number of reasons why this little gadget is brilliant.

Firstly you can mix and match all manner of DDR up to a maximum of 4GB, a limit we're sure will be surpassed in future iterations. The beauty here however is that it finally enables you to put all your old DDR modules from past upgrades to good use.

Secondly, connecting to a SATA controller and appearing as a SATA drive, there's no need for drivers – you can plug it in and use it straight away with Windows and Linux systems alike.

But what about the contents of the memory when the PC is switched off? No problem – the modules are powered by the PCI bus, retaining their contents for as long as the PC is plugged into the wall, even if it's currently switched off. If, however, power to the PSU is disconnected, an onboard battery will still keep the integrity of the memory for up to 12 hours – allowing you to retain its contents in a power outage, or if you move your PC, for example.

All nice, but what you really want to know is how fast it goes. Beautifully, from the demonstration *Atomic* was given.

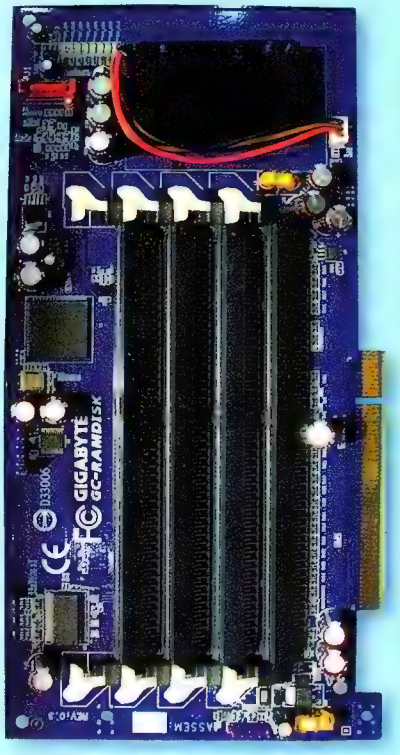
The i-RAM clocked up a staggering 122MB/s using HDTach. It's not just raw throughput though, it's a *consistent* velocity across the entire storage space.

Consider your standard hard drive – the outer tracks are faster than the inner tracks, which is why benchmakrs like HDTach test the entire storage space and report a maximum and minimum throughput for a drive. A SATA drive will net you something like 55MB/s maximum and as low as 25MB/s minimum, with an average of 45MB/s. Bottom line – the speed of your data depends where on the disk the data is placed.

Not so with the i-RAM, where the top speed is maintainted across the whole 'disk' – granted, it's only 4GB, but imagine if you put Windows on it and used it as a boot drive? Gigabyte did, and reported a speed up as much as ten times faster.

Naturally, the first question I asked Gigabyte was 'So, can you RAID two of these babies?' Apparently, I was the first at the show to suggest the idea to them. 'we haven't tried that yet' I was told, 'but we will!'

You can bet we will too.



The i-RAM is one of the more innovative pieces of kit to come out of Computex this year. And it's sexy.

Sneak peek at DFI's new SLI masterpiece

While at the DFI booth *Atomic* was given an exclusive sneak peek at DFI's new upcoming nForce 4 SLI based LANParty – already one of the most popular Socket 939 overclocking boards in existence, this new edition still under development goes only by the name 'B version' for the moment, but sounds like it's going to kick major bum. Compared to its predecessor, the nForce 4 SLI-DR, this new version includes the following key changes:

- 4-phase PWM to improve performance with dual core CPUs
- Increased space around the PCI-E 16x slots to be more flexible with card cooling systems
- 3 PCI slots over the original 2 PCI slots
- Replacing the Silicon Image Sil3114 with a Promise PDC40719 to support four extra SATAII ports

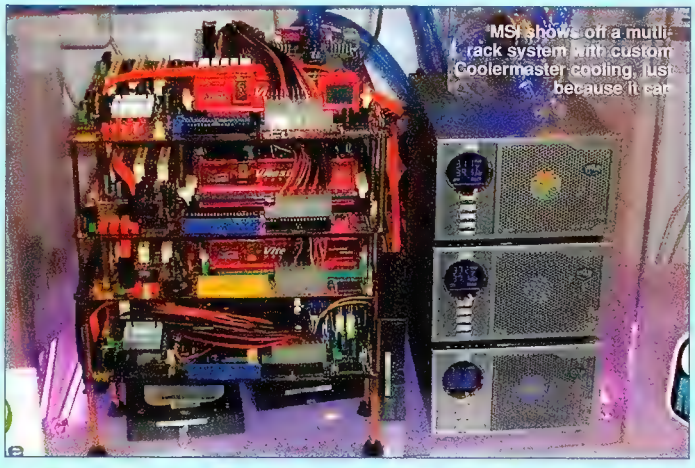
Downsizing

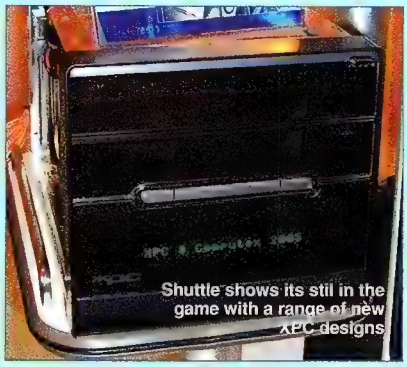
There was also an odd trend of taking Apple's iMac mini and running with it. AOpen demonstrated a mini PC based around the Pentium M processor running Windows that definitely takes its smooth stylings from the iMac mini. Based on its range of XC Cube PCs, this new mini-PC is suprisingly well made, and AOpen was keen to call it the world's smallest desktop PC. Indeed, its form factor is a mere 15 x 15cm, and still sports a DVD drive. Other stats includes 256MB of RAM, an 80GB hard drive, 802.11g wireless, and a variety of outputs including DVI, S-Video and Component out.

Interestingly enough, just opposite the AOpen stand sat FIC, who also claimed to have the world's smallest PC. FIC's little black box based around an AMD Geode processor is, in fact, smaller than AOpen's design – however unlike the AOpen machine it features no removeable media drive at all. Coming with 256MB of memory a 40GB drive, and no TV out capability it's both smaller, and less powerful, than AOpen's design. Though it does sport a Li-Ion battery.

VIA was in on the act too, announcing its all new Nano-ITX range. These are some seriously small boards, and keep in mind they come complete with VIA's new CoreFusion 'Processing Platform' – an Eden-n processor, CN400 North Bridge, and S3 UniChrome graphics bundled into a single chip. With an emphasis on multimedia support, these boards will make an excellent base for HTPCs.

Lastly, if there is anyone out there to demonstrate that smaller is better, it's Geil with its 1.5 CAS DDR memory. I bet you can't wait to get your paws on that.





ASUS

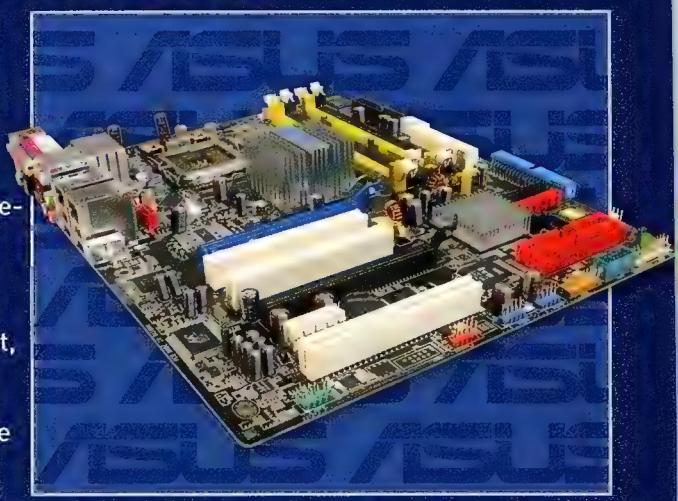
Heart of Technology

At ASUS we don't just make products to make your life easier, we create them to complement your lifestyle. ASUS has won hundreds of awards not only for quality, high performance prodcuts but also for innovation and design. Whatever you needs, ASUS will meet them.

First with the best

At Computex 2005 ASUS showcased an extensive line up and launched a number of pioneering products. Here's just a small highlight of ASUS' world leading innovations that combine performance and power with ease of use to match your lifestyle choices.

High-end motherboards



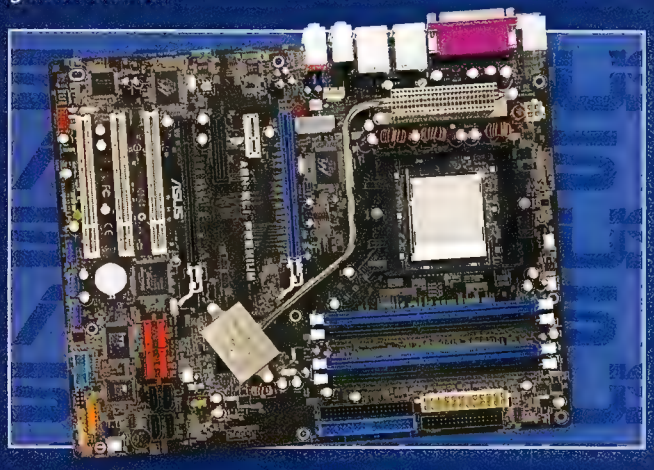
The **P5WD2 Premium Motherboard** brings together the power of high-performance computing with feature-rich design. Sporting Intel's 955X chipset with dual-core support, it's the world's first motherboard to bundle both wireless 802.11g and TV tuner together, providing a complete multimedia package for the networked home. In addition, the P5WD2 is the first in a new line of AI (ASUS Intelligence) products that bring together, for the first time, seamless form and function to enable superior performance. The AI Quiet feature controls CPU and fan speeds to ensure cool, quiet, operation of the computer while Stack Cool 2 effectively dissipates heat from core components to the underside of the PCB, greatly reducing system temperatures.

'ASUS delivers, time and again, products above and beyond others in their class.'

Atomic MPC

Cool and quiet together

The **A8N-SLI Premium** features an innovative new thermal design, incorporating AI Cool-Pipe technology to provide superior cooling with a quieter environment – finally you can say goodbye to noisy Northbridge cooling fans. Utilising the power of nForce 4 and fully supporting AMD Athlon 64 X2 dual-core processors, only the A8N-SLI Premium provides a stable and quiet platform for overclockers and gamers alike.

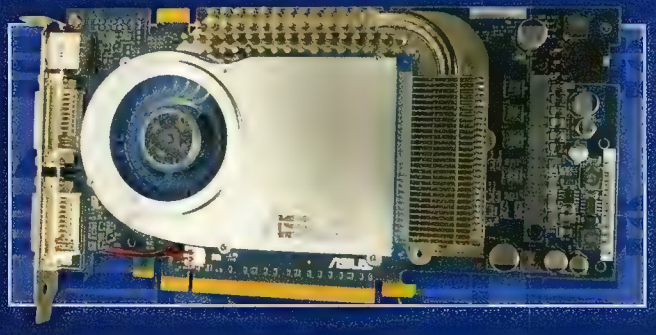


Watch your friends, live

Only ASUS bundles its unique **GameLiveShow** technology with its video cards.

GameLiveShow allows gamers to stream their games over the internet for the enjoyment of others. Why complicate matters with variations of hardware and software, when you can use an ASUS video card that integrates it all. Not only does this technology let you stream live gameplay, you can also record games for future viewing and watch up to eight other players in total realtime as you frag, capture and control using ASUS' GameFace technology.

And it's all available, straight out of the box.



Splendid Video Enhancement

Movies played on the PC often lack an element of image qualtiy to those seen on TV. Consumer entertainment devices often use high-end video processing technology to make TV images rich and vibrant, something that PC based video cards lack. ASUS' new **Splendid Video Enhancement** technology for ASUS LCD monitors use advanced Area Pixel Processing Algorithm to carefully evaluates each pixel in every frame and adjusts them for optimal image quality. Colors in each regions are dynamically optimized according to conditions most favorable to the human eyes. Like human eyes, which balance the over all brightness and color contrast of the world we see, Splendid is programmed to adjust the brightness output level of the dark areas in each frame to bring out every image detail even during dark and rainy scenes. Seeing really is believing.

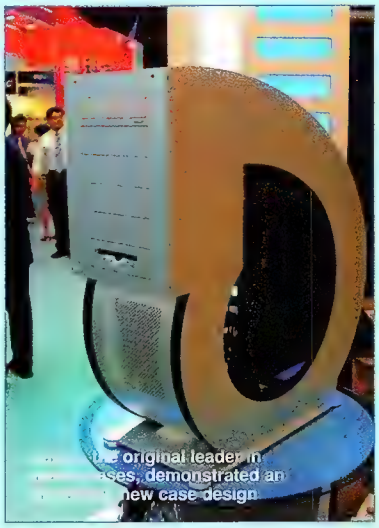
The ultimate notebook

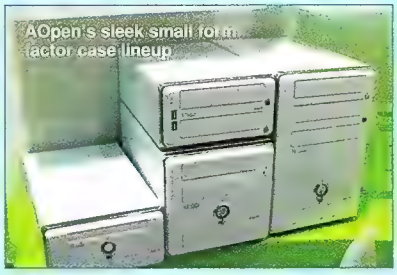
The new **W2V** notebook is the first to provide wireless reception for DVB-T – yes, digital TV right on your lap! Take the notebook with you to enjoy your favorite shows without tangling cables. With the large 17-inch wide and high brightness LCD screen, the W2V sets a new standard for portables that others will follow.

First in the world

ASUS is the number one motherboard and video card manufacturer in the world, selling more than any other manufacturer in its class.

Find out why today.

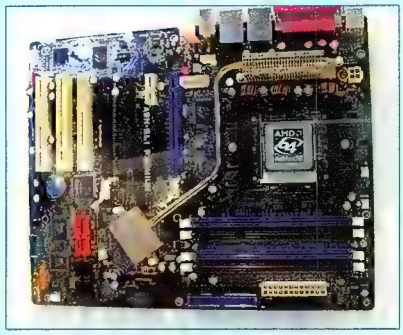




Honorable mentions

From the smallest to the biggest, Tyan was proud to demonstrate its new 4 and 8 way CPU motherboard platforms that support AMD's dual-core Opeterons. I need only say this – 16 cores in a single machine. Two of these machines might just have the tackle to to power the *Atomic* site.

ASUS' new A8N SLI Premium takes the 'silence is golden' idea a step further and replaces the Northbridge heatisnk and fan with a heatpipe combination. Just how well it works we'll be sure to test when it comes in.



ASUS brings heatpipes to the Northbridge

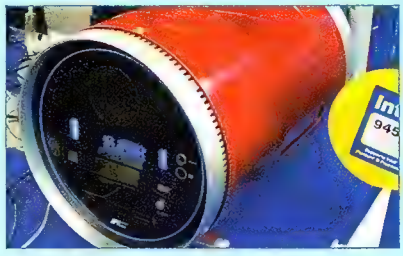
Also from ASUS and worthy of mentioning is a new range of monitors, including the PM19T, a nice 600:1 contrast ratio 4ms jobbie that's sure to give Viewsonic's 4ms a run for its money.

Shuttle, as usual, had been innovating and demonstrated a range of new XPC boxes including both Intel and AMD 64-bit and dual-core boxes and a selection HTPC targeted machines. Of particular note was the the XPC 5031P, an LGA 775 dual-core ready beast that boasts SATA II and Shuttles SilentX cooling. However the cream of the cake had to be the XPC SN26P, an AMD Athlon 64 dual-core X2 box complete with two 6800GT cards in SLI – yes, good things really do come in small packages! Not suprisingly, in order to ensure proper heat dissipation the 6800GTs utilise Shuttle's own heatsink and heatpipe cooling technology, which means you have to buy the box with the cards pre-installed. It's cool in more ways than one.

You might remember the Coolermaster Stacker we burnt on the cover of *Issue 43* – not that we want to tempt Coolermaster's fate, but they've released a new and improved version of the stacker, the Coolermaster Stacker 830. This case has nine (!) 5.25" bays, can support up to three 120mm fans just on the front, and is compatible with a range of boards including ATX, BTX, and PICO-BTX. It also looks supremely sexy (see below).

Coolermaster's new CM Stacker 830. Sweet!

Speaking of cases, FIC took a trendy angle with their cynlindrical Piston case. Using a BTX motherboard and straight through airflow design, cool air is literally passed over components from the front of the case to the back. Complete with a digital display and coming in a number of colours, it looks like an oversized and fashionable MP3 player. Only better.



FIC's cyclindrical case – the Piston

Finally, Zalman's new CNPS9500 cooler deserves a mention – featuring heatpipes and a cylindrical copper fin design, Zalman claim this puppy is the best air-cooler yet released. Naturally, this is a claim we'll be happy to test and bring you the results for!

Zalman demonstrates its latest air cooler

Highlighting the best

Naturally, these weren't the only highlights on show at this year's Computex, they are but a taste of the exciting gear coming to our shores very soon now. Expect full reviews and benchmarks in coming issues!


SONY
Feel the need for speed?
Turbo
POWER
TAPE MOTION
CLEANING REQUEST
REPLACE TAPE
Turbocharge your back-up
Delivering increased speed
are the latest progression
6MB/sec and 40GB compared
35GB. While AIT-2 Turbo
offering 6MB/sec and
Turbo solutions. Visit sony.com.au/datastorage or call 1800 017 669.
IT'S A SONY
Turbo

atomic chat

Talking to the finest human beings on Earth... and beyond.

Michela Ledwidge

Ever wished movies could be modded like games? Stuart Ridley chats with Michela Ledwidge, an Aussie digital media guru/film director whose latest film project puts everyone in the director's chair.

Michela Ledwidge is somewhat of a unique Australian with a unique vision – that storytelling can be as interactive an experience as it is entertaining. Her latest production puts everyone in the director's chair and is set to change the way you think about the art of film making.

Atomic: When we first heard about MOD Films, we thought the 'mod' was shorthand for 'module' – as in music mods. But you're doing more than that, you're going for modification – like game mods – of film assets. What are some of the things that can be done with film mods?

Michela: They range from the fun and cheeky, being able to change one thing, like a lot of web content is, all the way through to saying 'this is not just someone else's work, this is a collection of material that I can recontextualise into something of my own work.' So you're treating bits of the film as a stock footage library.

Atomic: Or like a DJ's record box?

Michela: Exactly. It's sampling culture. There's all this amazing content produced – what happens to it after it's been through the traditional distribution cycle? After you've got the work on DVD, what happens then? In our model we still want to sell you film DVDs, but you can do more with it than just watch it from beginning to end.

Atomic: What was your first experience with interactive film?

Michela: BDE's (Brilliant Digital Entertainment) idea that you could stop a film halfway through, do something to it and have it go off in another direction. Seeing *Cyber Swine* (based on Sam Young's comics) and being able to change the language – not just to have the soundtrack change, but to see the character's lips move in sync to a different soundtrack; and also to be able to change the camera perspective on the action.

Atomic: You then scored your own deal with BDE in the mid-90s to create a choose-your-own adventure style interactive film. Tell us about that experience: what were you aiming for?

Michela: The deal was to develop an idea I had, which was my own notion of interactive filmmaking: being a fly-on-the-wall in a Hollywood picture – a big epic action story – but being able to wander away from the action and explore the world it's set in a little more. I got to develop a big sprawling non-linear narrative over a year… but it never got made because the whole business model BDE was exploring had a few problems.

Atomic: What in your opinion was worthy in BDE's interactive film concept? And what was wrong?

Michela: It put interactive story under the microscope. We learnt some really valuable things, like we don't necessarily have the ability to keep up with the audience's imagination when you tell them: 'You can change the ending'. We found it was more interesting for us writers to write these stories than it was for the audiences to play through them!

Atomic: The *Red vs Blue* guys (Rooster Teeth) have hugely raised machinima's profile – they weren't the first but they've nailed it with great execution. In your scene, who else is doing something similar? What are you doing that's totally original?

Michela: We're following in the footsteps of what some feature filmmakers have done around the Creative Commons, starting with *Nothing So Strange*, Brian Flemming's mock documentary about the assassination of Bill Gates. When it was released under the Creative Commons it included additional material, such as some of the rushes and different camera angles for parts of the film, so that people could reuse it. He broke new ground by giving the audience bits of his film to use legally but very little happened with it. It was very exciting at the time conceptually, because it broke through the notion that filmmakers don't want their material to be re-used. But there wasn't any plan supporting the remixable experience.

atomicbio

Name	**Michela Ledwidge**
Occupation	**Director**
Websites	**www.modfilms.com**

Michela Ledwidge has been developing a personal approach to interactive storytelling for over ten years. Her latest production is a modifiable film project centred on a short flick titled *Sanctuary*.

She is an Australian filmmaker with a background in sustainable systems design. Her award-winning work includes films, interactive media, live performance, and online services. In 2001 she wrote, directed and produced *Horses for Courses*, which won the Web3D Art Prize at SIGGRAPH 2001 in LA. In 2004, she founded MOD Films with an Invention and Innovations award from NESTA to produce re-mixable films and tools for film re-use. Her film *Extreme T* is distributed by Arkaos as a VJ Content Pack. Michela is a member of the Web3D Consortium and has previously been a member of the UK Cabinet Office's Special Interest Group on Open Source Software, and the BAFTA Interactive Entertainment Committee (2002-2004).

So we're trying to make an interactive entertainment experience around publishing, rating and installing mods. Not just your own creations but other people's.

Atomic: So that could be changes to the flow, to the plot, to the audio?
Michela: In theory it could be any of those. We don't know yet what they're going to do. We're focused on carving our space so that we can do something new.

We're creating a film world that encourages people to leap off and explore their own ideas.

I'm producing two sample mods (to start with), two ways of interacting with this particular story that I personally like and aim to have fun with: one of them is a rhythm game and the other is a DJ/VJ interface.

Atomic: The remix of film is most visible in the dance party scene – and I know you've been a VJ (Video Jockey) for several years now – what has that taught you about remixing film?

The wet dream of the games industry is to sell software titles to people who don't play games.

Michela: VJing has reminded me that there's something real and exciting about the live experience. There's something magical and fulfilling for me on a personal level about performing. The notion of performing – having an audience there that you can feedback with directly, live – is something that filmmakers often don't tap into. Sure they have screenings, but the filmmaker is very rarely on the stage with their film, looking back at the expressions on the audience – they're usually looking the same way as everyone else, at the screen. All filmmakers listen intently at their test screenings to hear how the audience reacts. VJing goes one step further, with the flexibility to adapt the film on the fly to the reactions of the audience, in the same way a DJ modulates their set according to what tunes people are getting off on, what time of night it is...

My best responses to my films come from people wanting to see me play with my films live. Not only am I learning a lot about what people like in connection to my material, it's actually something not many people are doing. So when it came to showing my film *Horses for Courses*, which was actually designed as a realtime film, I got to take that to six different countries. People kept on inviting me to events to perform it.

Atomic: When you release your pilot – *Sanctuary* – what will the audience get? Will it come in a box, and what online activity will support it?
Michela: The current plan is that it will be released as a short film DVD that in addition to being playable in your DVD player, will also be a software product that runs on your PC or PC-compatible console in your living room. That product will allow mods to be installed into it from the net.

Atomic: What tools are you working on?
Michela: There are already so many tools out there that are available for people to mess around with; there's not that much high-end media (legally) available. That's kind of the point of this project. You can use the tools other people are making, or that you can find/download on your P2P network of choice and apply these tools to our media.

We're spending next to no time on those apart from the tools we use ourselves to create the film in the first place. We have designed our own asset-management system to keep track of the millions of bits of content that we're assembling: the concept art, the visual effects breakdowns, and the shot lists, story boards...

We're also trying to focus on having a lean media player which is very much like the video players you can download from Microsoft, Apple, Real, DivX. Except that our player – in addition to playing existing media formats – will play files in the remixable film format.

Atomic: OK. So what exactly is your pilot *Sanctuary* about?
Michela: *Sanctuary* is about a sixteen [year-old] girl who loses her father, goes online and becomes a superhero without leaving her bedroom...

Atomic: ...of course... the sanctuary!
What might the future be for MOD Films?
Michela: There's a fundamental conflict in MOD Films between my aspirations as a feature film director and the company's real opportunity to create remixable technology that supports any film out there. At the moment we're exploring both sides of that, but in essence, MOD Films is using the opportunity it has been given to develop this particular project as a calling for the team that's involved. It's all about story. MOD Films is a collection of people who are really excited about trying to do something different with story.

Atomic: What will it take for Hollywood to buy into the concept and usher in a new age of film entertainment?
Michela: Sales! Pure and simple. Hollywood is totally aware of what this project is about, on one level. Though you could argue most filmmakers aren't aware of what the opportunities are.

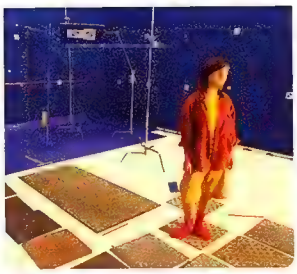
Atomic: Right. So why did you go for the Creative Commons licence?
Michela: Because in theory... Creative Commons provides artists an easier route to exploring some of these ideas about sharing, without getting bogged down into dealing with lawyers and the costs of creating your own licences.

If you'd asked me this question eight months ago, I would have said 'Because it's going to be really simple to produce a remixable film and licence it to the public'.

In practice, the whole Creative Commons angle to this project has been a real political jungle that we're only just starting to find our way out of.

The ground has been broken now. The licence scheme has been setup to allow artists to share work, which is a very ambitious thing, and hopefully this project will in some way encourage other artists to endorse the idea.

Atomic: A few film industry groups don't like the idea of moddable films. What's their problem?



Are modular films the way of the future? Michela Ledwidge thinks so. Using a combination of different films, as well as their own footage, modular movie makers can create works that are as interactive as they are entertaining.

Michela: The overarching issue is one of control. The film business is very old with very well established rules governing how material is produced and distributed. The idea that you can now empower your audiences to do previously unsanctioned things with your content is very dangerous to the [Hollywood] system. It suggests that the power players might have to change their way of working, or they could be superseded by new systems. In particular, when it comes to areas such as performers' rights, which is something we encountered here in Australia with the Media Entertainment Arts Alliance, who objected to our use of professional actors, by saying that remixing professional actors' licences was inappropriate.

The main issue for them is that they've been fighting a real battle within the traditional film process to give actors additional rights.

For example, MEAA objects to Australian export productions being dubbed in another country, for example the US, into another accent without any permission being required. From one perspective it is tainting the original sound and feel of the work, yet from another perspective, we know digital media supports this customising, so maybe over time we'll come to accept it as a right that everyone should have.

Personally, I think that where the line should be is that people should not be able to pass off a derivation of the original work as the original. Any changes should be clearly identified as changes from the original.

Atomic: How might the modifiable film concept work in a cinema? What tech would be involved?

Michela: There's a project called 'Grand Odyssey' (**www.mt-expo.com/index_e.html**) being demoed at World Expo in Japan at the moment that gives some good clues. They have a fifteen-minute computer-animated film, which is modified using a next-to-real-time process that takes images of the audience members' faces and transplants them onto characters. This whole idea of bringing audiences' likenesses into a film – customising a film to reflect a specific audience – is becoming technically feasible. Whether it's art or something that becomes part of the mainstream is another question.

Atomic: So for now you're really aiming at bringing more interactivity into the living room? movie experience?

Michela: Exactly. The wet dream of the games industry is to sell software titles to people who don't play games. I do think that the living room is where very sophisticated forms of interactive entertainment are being played – and will continue to be that way. You're not just talking about the people who are holding the control pad, you're also talking about the people in the same room who watch games.

So you have people getting non-interactive entertainment by watching games and on the other hand, people getting interactive experiences from films (which aren't meant to be interactive) by ripping them apart, sampling them and remixing them.

The living room is where all these activities happen – in the privacy of our own homes. This concept is fairly new, so you need a safe space (sanctuary) in which to explore this stuff. I think a lot of what is going to be done with remixable film may not be appropriate for the cinema!

It's about empowering audiences to explore different areas. As a performer I'm interested in doing certain stuff in public but I think most people are going to dabble in this area in the privacy of their own homes well before they'd dare do it in public.

Atomic: What's the most recent tech you've fallen in love with? Have you opened it up yet?

Michela: I don't open hardware because I'd break it. But I am rather enamoured of my Archos AV400 portable video recorder. It's like an iPod that plays video and it means I can cart all my films around in my handbag. It's also pretty useful for ploughing through storyboards.

Atomic: Which device are you still looking for?

Michela: An indestructible hard drive!

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Looking at tech from the inside

Securing the airwaves

Wireless is all fun and games until someone gets a packet in the eye. Or something. So how does it work and how is it secured? **Matthew Ovrington** reveals all

Wireless computing has gathered serious momentum in the last few years with constant development and a bevy of new products coming to market. Believe it or not, wireless computing is far from new. In fact, people have been beaming data across the airwaves on corporate networks *en masse* since ratification in 1997.

It was partly due to Intel's decision to bundle a wireless adaptor with its Pentium M processor and 855 chipset and call the trio Centrino that pushed the technology to the mainstream computing public. Intel has invested heavily on promoting the 'unwire' message, and while plenty of other companies have offered solid wireless hardware to complement Intel's marketing push, the Californian chip manufacturer deserves some credit for popularising Wi-Fi.

There's a range of wireless components on the market – in fact, most of the hardware you can imagine existing for a wired network can be found for a wireless one. The most basic wireless network comprises a couple of wireless adaptors communicating directly in 'ad hoc' mode: the wireless equivalent of using an Ethernet crossover cable. A more common setup is for an access point to sit in the middle of a network along with a number of client adaptors. The access point serves as a hub for the wireless network, allowing several adaptors to connect at once. In smaller setups, combined access points and routers are used as bridges between wired and wireless networks. This is the system used in most homes to share an incoming ADSL or cable connection over the airwaves.

Interference

Because of the reliance on radio waves, Wireless network traffic is prone to interference. This can affect the signal strength and cause the network to drop packets. To combat this, the IEEE standards allow networks to drop their transmission speeds to try to improve stability. For example, an 802.11b network will initially attempt to connect at 11Mb/s, but if there's too much interference to reliably sustain that rate, it will drop to 5.5Mb/s. Again, if there are still problems, the rate will fall to 2Mb/s. This will continue until 1Mb/s, after which point the network will simply become unavailable. Technology is in the pipeline to combat interference, but it's still an inherent problem that's somewhat hard to escape.

Securing the network

Of course, given that there are no physical boundaries to wireless networks – any compatible device within the reception area will be able to see your network – security plays a crucial role in wireless networking. Though traffic can be sent unencrypted across a wireless network, the popular (and sensible) standard is to apply one of several layers of security. WEP (Wired Equivalent Privacy) is the most basic layer. It encrypts packets sent over the network using either 64 or 128-bit encryption. It's common on home networks, but it's not impervious to hackers. Packet sniffers like NetStumbler (**www.netstumbler.com**) can be used to crack WEP passwords, though it's a time-consuming process and requires the listener to capture several gigabytes of network transmissions.

WPA (Wi-Fi Protected Access) is a far more secure method of protecting network traffic. It relies on TKIP (Temporal Key Integrity Protocol), and rotates encryption keys to protect traffic from packet sniffers like NetStumbler. WPA is can be used in either 'personal' or 'enterprise' mode. In personal mode, a pre-shared key (or password) is used to authenticate network access, while

ridingthewaves

At its source, wireless networking makes use of ordinary radio waves (albeit extremely short-frequency ones) to carry digital data between devices.

In the case of most Wi-Fi networks access points – devices through which wireless clients can communicate – they broadcast their SSID (Service Set Identifier) information out over a radio network.

This is essentially a beacon that alerts other wireless devices in the area that a network is present. Other wireless devices can pick up the broadcast and attempt to connect to the access point.

Some network handshaking takes place between the AP and Wi-Fi adaptor, and, if the appropriate security credentials are met, a connection is established. At this point, the wireless connection functions just like a conventional wired network, at least to the user.

Adaptors are available in PCI form for PCs, PC Card for notebooks, Flash for PDA, and USB for those that don't want to mess around opening their systems. All offer essentially the same functionality, but have distinct benefits for their target markets.

For example, most PCI cards include connectors to allow massive external antennae to be connected to boost range, while PC Cards, Flash and USB adaptors are designed for more mobile users that will generally connect to access points when they're close by.

wirelessnomenclature

The Institute of Electrical and Electronics Engineers (IEEE) sets the standards that pertain to networking, and have designated the number 802.11 to represent wireless networking (as a comparison, 100Mb/s Fast Ethernet is 802.3).

The standards are ratified by the IEEE (found online at **www.ieee.org**), but the Wi-Fi alliance (**www.Wi-Fi.org**) has the tedious job of testing hardware to ensure it complies to the IEEE's specification.

Wireless networking is available in a few flavours, with the most common being 802.11a, 802.11b, and 802.11g. All wireless standards employ frequency ranges to send data (just like a conventional radio or walkie-talkie), and each frequency range is divvied up into channels to allow several networks to exist in a given space without interfering with each other.

Each flavour has its own particular specifications, and penetrates a slightly different market to the others.

802.11a hardware has a strong foothold in the corporate space. It operates in the 5GHz spectrum and offers 54Mb/s of bandwidth. Twelve non-overlapping channels are available in the spectrum, which offers plenty of room to install several access points on a corporate campus. Because of the high frequency, 802.11a is best-employed in line-of-sight applications, which makes it inappropriate for most homes.

802.11b is the standard most used in early consumer Wi-Fi gear and was included in the first Intel Centrino offering. It operates in the 2.4GHz spectrum with 14 overlapping channels available, and offers a paltry 11Mb/s bandwidth. This is adequate for surfing the web wirelessly, but seriously falls down for moving files around a network.

802.11g also employs the 2.4GHz spectrum, where, like the 802.11b spec, 14 overlapping channels are available. It offers 54Mb/s bandwidth and is commonly used in home routers. The 14 overlapping channels available in 802.11b and g are separated by 5MHz, so it's wisest to use channels spaced widely in the range (1, 6, and 11) to minimise interference.

A variant is also available where router and network cards are able to take advantage of a number of channels at once to double the theoretical bandwidth of 802.11g up to 108Mb/s (or 802.11b up to 22Mb/s). This is called channel bonding, and is marketed under several names, depending on the hardware manufacturer. Different manufacturers' hardware isn't generally interoperable, and as a result these bonded systems are best suited to small home networks where there aren't a lot of channels operating within a small physical area. Large-scale corporate implementations are rare, mainly because of the limited number of channels available.

The standards are ratified by the IEEE, but the Wi-Fi alliance has the tedious job of testing.

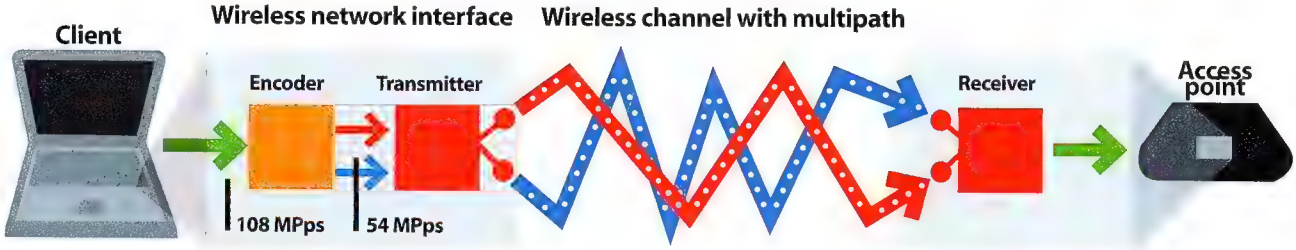
Looking forward

One of the more interesting industry developments in recent years is the emergence of the proposed **802.11n** standard. Though the IEEE probably won't ratify it until late 2006, a number of companies are pushing ahead and offering so-called Pre-N hardware to consumers. The proposed standard offers a substantial speed boost over conventional 802.11g Wi-Fi networks by making use of MIMO (multiple input/multiple output) technology. MIMO is one of the cornerstones of the 802.11n proposal, and it helps boost transmission speeds through clever use of antennae.

MIMO hardware uses multiple antennae to broadcast more than one data stream on the same channel. The system, dubbed smart-antenna technology, takes advantage of multipath propagation, and the way RF signals bounce off objects. Signals are sent from multiple antennae at once, where they bounce off objects and reach the destination. Because the antennae are apart, their signals reach the destination device at slightly different times without interfering. The collected data is then reassembled at the other end. The system allows the antennae to send different data simultaneously (though there's some overlap in the data sent in each stream to prevent packet loss), which in turn leads to substantial leaps in effective bandwidth. Better yet, it also provides a massive boost in range, with Belkin boasting a 600 percent increase in effective coverage for its Pre-N products (bear in mind that this is in three-dimensions, and doesn't translate to a six-fold range boost in a straight line).

Hardware is hitting the market locally from most vendors, including Belkin, Linksys, and NetGear, with prices starting around $300 for an access point. Granted, the technology is currently expensive, but it offers bandwidth at around 100Mb/s and is ideal for a high-powered home network. Be careful in shelling out your cash at the moment, though, as there's no guarantee that hardware based on the draft standard will work with final ratified products further down the track.

In fact, there's still substantial debate within the IEEE as to whether or not 802.11n will be officially adopted, but you can bet that the next official standard will implement a form of MIMO and push bandwidth in excess of 100Mb/s.



MIMO technology works by using multiple antennae to bounce signals to the reciver, whereupon the signals are combined and aggregated to create both a fast and reliable network capable of breaking through interference, all while extending range to boot. Expect MIMO to become the prevaling standard soon.

the Enterprise mode relies on a third-party authentication server (usually a RADIUS server) to approve access.

WPA2 (Wi-Fi Protected Access 2) is included in the 802.11i security specification, and the Wi-Fi alliance is testing products for certification. The big difference between implementations is that WPA2 includes AES encryption. This provides a higher level of security and is demanded by some government departments and corporations.

One early problem was a lack of solid, easy-to-use security configuration wizards to help ensure users actually enabled wireless security. These days, it's much easier, and just about every notebook vendor worth its salt supplies tools to help its users configure and maintain wireless security on the road. After all, no physical corporate network would escape the same scrutiny as any breaches of the network could have serious impacts on company intellectual product. The wireless network is only one element of the security, picture, though.

A number of companies claim expertise in the art of wireless security. Currently Lenovo (formerly IBM's PC division) is touting that its wireless security is among the best in the world. So who better to ask? According to Lenovo's Greg Hunt, ThinkPad Brand Manager for Australia and New Zealand, more than just a company's network needs to be secured – any mobile devices that connect to that network have to be secured as well. 'By virtue of their (mobile) nature, laptops are more prone to theft or loss. The challenge in securing laptops is in protecting the data, encrypting wireless transmissions and recovering lost or stolen machines', said Hunt.

The prevalence of Wi-Fi enabled notebooks highlights an important message: if the devices that connect to your wireless network are insecure, your entire network is compromised. For this reason manufacturers such as Lenovo offer fingerprint readers on portables, and high-level encryption is available to help prevent unauthorised access to sensitive information. It doesn't end there, though. Notebook manufacturers are experimenting with a range of security methods to help ensure data is secured from prying eyes. Windows Longhorn (when it's finally released) is scheduled to include extremely tight security integration to encrypt data on the machine and provide hardware-based user authentication.

Wireless is becoming an increasingly household feature as laptops, portable devices, cheap PCI cards and USB dongles make it an easy method to network house and home without the hassle of wires.

Wireless hacking

Early on, before WPA managed to gain a foothold for securing wireless networks, it was relatively common for networks to suffer attacks. With little more than a portable computer, a directional antenna and some monitoring software like Netstumbler, it was common for geeks to drive around looking for unsecured Wi-Fi networks and attempt to connect to them. In fact, in the early days of consumer wireless networking – before vendors heavily pushed the security message – it was straightforward to pull up outside a well-appointed suburban home and be surfing the internet through a hijacked wireless connection. This became known as war driving, which is in turn a play on war dialling – a technique used in the 1983 movie War Games, where Matthew Broderick's character configured his modem to dial phone numbers looking for other modems.

Thanks to increased awareness, better software applications to help configure networks, and widespread adoption of capable security methods, war driving is becoming an increasingly fruitless pastime.

The battle is for the various standards organisations and companies producing hardware to implement ever-stronger security and faster transmission standards to keep advancing the technology.

wimax

Another emerging standard starting to gather serious momentum is WiMax. Though it falls under the 802.16 grouping, it stands a good chance of dramatically changing the way wireless networking and telephony interact. WiMax operates in the 2 to 11GHz spectrum and boasts a theoretical range of around 50km and bandwidth of 70Mb/s. Though commercial implementations will surely pop up when the standard is ratified officially, WiMax looks to be deployed as a metropolitan area network (MAN), where it could link 802.11 access points together to provide city-wide internet access. Mobile phone manufacturers are already toying with the idea of including WiMax chips in handsets to enable VOIP calls on a city-wide scale. Definitely something to look out for!

handylinks

If you want to read up more on wireless standards, security, and upcoming ratification, be sure to check the following websites:

www.ieee.org *Institute of Electrical and Electronics Engineers* (IEEE) ratifies standards that pertain to Wi-Fi under the 802.11 numbering scheme.

www.Wi-Fi.org *Wi-Fi alliance* Offers testing and certification for wireless products based on the IEEE 802.11 standards.

www.netstumbler.com *Netstumbler*
A capable tool for monitoring and troubleshooting a wireless network.

en.wikipedia.org/wiki/IEEE_802.11 *WikiPedia 802.11*
The WikiPedia entry for 802.11 networking offers a good overall rundown of the technology.

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hardcore

News, reviews and round ups on the latest hardware technology for your box

As a result of the fairly recent influx of next generation hardare, such as chipsets and CPUs, there really isn't a great deal of high level groundbreaking technologies imminently coming out. Well, excluding perhaps ATI's CrossFire (in response to NVIDIA's SLI) and NVIDIA's counter-attack G70 (GeForce 7800 GFX). That's not to say the industry is dry, however. In fact, the opposite couldn't be more true.

No doubt influenced by Computex and trying to get some form of attention at the wildly popular technology jungle show, manufacturers are going all out on the weird and wonderful. We're seeing a lot of crazy new hardware about to hit the market and to be honest, it's times like this I really love the tech industry, as this is where all the inventive and creative juices are allowed to spill over and manifest themselves into bizarre oddities.

Some of these widgets are merely competition rising on new concepts, such as superbly large dual-GPU cards from ASUS and MSI, but some are even revisits to technologies gone by that never really picked up beyond a small niche. Hardware such as Gigabyte's new iRAM. Jacking into a standard 32-bit PCI slot as it does, with four DDR DIMM slots, a SATA port and a battery. Cheap, solid state storage. Fantastic. Then there's the ATOP AGP to PCI-E convertor card from Albatron.

What's particularly note-worthy is how these companies are willing to innovate, throwing caution to the wind and letting it take them wherever the heck it wants and hoping for a big bang. With no hard evidence on who will use the product or why, this is a valiant step into the unknown. This is something I like to see.

With Computex now behind us, I'm really looking forward to playing with the new gadgets and you can be sure we'll let you know our thoughts on them too.

Nathan has schematics for world domination devices.

this month

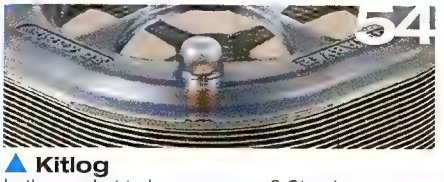
▲ Tech Trends
Raging on: next-gen optical storage; quad-core processors on the horizon; and loads more...

▲ Ground Zero
Dan Rutter peers outside and ponders how his Kung Fu would fare in the real world.

▲ Gearbox
If you like your widgets and toys, we have three pages packed full of doohickey goodness.

▲ Head to Head
Digital TV is upon us, but what tuner should you be packing into your box? Find out...

▲ Framerate
If frames are your game, then Framerate will satiate. Three more video cards go through hell.



▲ Kitlog
In the market to buy new gear? Check our roundup of the recommended best.

hardcorereviews

▲ NVIDIA GeForce 7800 GFX

short circuits

ATI has finally bitten back at NVIDIA's video decoder, which is onboard all sixth-generation GeForce cards (known as 'PureVideo'). It has announced that the next generation of RADEON cards, codenamed 'Fudo' (R520), will have an onboard H.264 (the video compression standard for high definition) video decoder. This is fantastic news for movie buffs and HTPC owners alike, because with its hugely increased bit rate and a more efficient compression technique, high definition H.264 requires far more processing grunt in comparison to the current DVD format, MPEG-2. Having a specialised decoder chip on the card may prove significantly worthwhile and a godsend to many-a-CPU. Rumour abounds that ATI may even throw these chips on some of their older cards, making an ideal solution for the home theatre system.

IBM has made public all the tasty technical details of the Cell processor (which was also joint development with Sony and Toshiba), with all libraries and full chip specs. There is hope this will attract wads of support from the open source community. Big blue claims this is essentially donating four years worth of intellectual property to the public. But what better way to garner support for your processor than to have the support of a potentially large community behind it? Check out the Cell's research site here: **www.research.ibm.com/cell**

Some smart folks at HP have devised a new technology that will improve the working yield on chips significantly. As chips get smaller, and further enter the realm of nanotechnology, the chances of producing bung chips increases. Using chips a third of the size of current processors, HP have managed to get near-100 percent yields. How has it done this? Basically through redundancy; the chips pack 50 percent extra wires and make use of a new crossbar architecture.

tech trends

Quenching your thirst for the latest technology and hardware happenings

Burn baby, burn

We want unification, but they don't, reckons Nathan Davis.

The storage wars are raging and there's no sign of a slow-down. Shortly after Toshiba announced HD-DVD's new 45GB storage capacity – in comparison with the then 50GB roof-limit of Blu-Ray – TDK has upped the ante by announcing a new Blu-Ray disc that holds 100GB via the use of four layers. The MPAA must be absolutely loving this.

With Sony's Playstation 3 set to use Blu-Ray by default, and manufacturers having to choose sides on which standard to support, one might assume, rightfully, the imminent death of any form of next-gen unified standard for optical storage. Add on to this the fact that an optical drive supporting both mediums is so far at least a dismal dream, it would appear we're doomed. This is a crying shame, but with capacity being at the centre of this optical race, one thing is certain – there will be much storage to be had. You could probably store a heck of a lot of 'Linux distros' on the one disc.

But guess what? This has already been topped. Though still in theoretical phase, Iomega has fleeced the thunder and beaten to a pulp the optical-storage capacity war. If you're looking at downloading and mailing around the entire internet, Iomega's been granted a patent on an optical medium that stores up to 40 to 100 times the amount of the current DVD medium. So we're looking at about 800GB. Aside from the mere mention of that exciting your reproductive organs, as that definitive saying goes, no one will ever need more than this. Well, until competition steps in, at least – 'Match it? We have a *two-terabyte* disc! Yeah, eat that!'

Of course, for us to want to use it, the burn time would need to be a stonking lot faster than today's DVD burning speeds. Given that dual-layer 8GB discs can now burn at 4x, taking about 25 minutes, it'd take an 800GB disc – at approximately the same write speed (not discounting the exponential increase in speed as you burn toward the outer tracks) – a little under two days. Which is a tad long in our books and why Iomega has also laid claim to speeds of 5 to 30 times faster than today's DVDs (whatever they're claiming as 'today's'). Whether or not this technology will be realised within the next year, two years or ten years – if at all – is anyone's guess. So the options jump back to HD-DVD versus Blu-Ray, for now. At least until they pull their heads out of their bodily orifices, smell our angst and create a single unified standard, which would be far better for everyone involved.

Awesome foursome

Nathan Davis loves the quad-core action.

There's no question of the potential power behind the new dual-core processors, just like 64-bit, however dual core is already looking old hat. Likely to be based on a 65nm fabrication process, quad-core CPUs from AMD are hinted to hit the market sometime early next year, with the Opteron on-target to be unleashed upon us by Q1. As expected, Intel's stomach churned at the sound of this and it whipped out its marketing card by retaliating with its own plans for a quad-core CPU. There isn't much information, if any, about this chip so we'll refrain from claiming wild things about it. But who's chasing who here? It's intriguing to see Intel trailing behind its licensee's recent technologies – much of which have become so wide-spread that Intel now use some of AMD's technology, such as EM64T which is duplicate of AMD's x86-64. Digressions aside, regardless of which side outs their quad-core CPU first, one thing is fairly certain – they won't be cheap.

In other expensive CPU news, AMD's new 939 power horse processor, the Athlon FX-57 – running at 2.81GHz – should be hitting town by the time you read this. Rumour has it the competition is off hiding in a bomb shelter and enthusiasts' wallets are threatening to 'end it all'. With the FX-55 running at 2.6GHz, the only difference is the increase in clock speed, so the performance jump between the two isn't huge, but every bit counts, naturally. We hear it doesn't eliminate the owners of these beasts from being superbly 'leet'.

So much pleasure in such a small package!

Too cheap?

Are budget cards worth it anyway? Maybe, thinks **Logan Booker.**

NVIDIA recently lowered the price of its TurboCache parts in order to make them more competitive. The reduction was in the order of US$15, which doesn't sound like much, but considering the cards retail for next to nothing anyway, it's actually a considerable slash – even more so when you realise that NVIDIA's high-end cards only saw a cut of US$1.

Which really is nothing.

The interesting thing here is that both ATI and NVIDIA advertise two technologies only available in their budget ranges – namely HyperMemory and TurboCache.

To put it simply, the added hyperbole allows the cards to page video data to system memory (something that video cards have been doing since the introduction of the dodgy PCI bus hack known as the 'Accelerated Graphics Port') faster.

This makes the budget range even more appealing to your average Joe, let alone sophisticated graphics technologies designed to minimise system bottlenecks. This makes it easier for your technically inclined PC retailer to flog underperforming video cards. Throw words like 'Hyper' and 'Turbo' around and it's easy to impress even the most conservative purchaser.

So, should this sort of tech be on the high-end cards? Maybe. Apparently NVIDIA has plans to add TurboCache to its next-generation cards based on the G70.

The thing is these technologies will do crap-all for high performance cards with 512MB of RAM. Where it will make a difference is on 64MB and to a much lesser extent 128MB parts. And even then the bonus in performance is debatable.

The reason is that a card with 512MB of local graphics memory will rarely page to system memory. Because of this, all this fantastic technology designed to make paging faster simply isn't used. It sits there, contemplating its existence next to16 pixel pipelines and a memory clock powering along at speeds just shy of 1GHz.

It's a boon for manufacturers though as they can skimp on the onboard graphics memory and hence produce lower cost parts. That's why you can get 64MB, 32MB and even scarily 16MB X300s and 6200s. Why scary? Because the average texture map these days weighs in at around 1-2MB with DXT5 compression, and when you take into account specular and normal maps, vertex data, shaders... the list goes on, you're going to burn through that 16MB in no time flat. Hell, 128MB cards get grief from modern games.

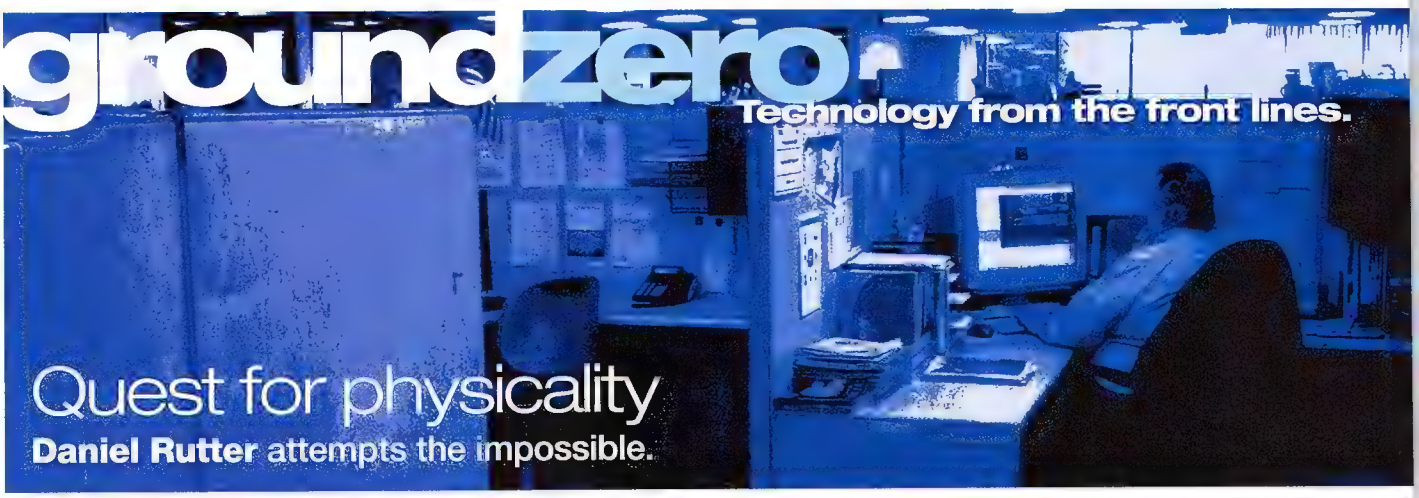
This makes support for DirectX 9.0 a moot point as the user will barely have enough graphics memory to store more than a few textures, let alone anything else.

So why are NVIDIA and ATI producing chips with less performance than a pair of meerkats pulling a sleigh full of crap? Because they have to. The budget market makes up a significant chunk of both companies' profits. There's also little point in producing a video card these days that doesn't support 3D acceleration. In fact, it can be hard to find a PCI video card in general. Not that you'd want one.

So, what are these marketese-packed budget cards good for? Well, we hear they're great for home theatre setups. And your grandma's PC.

groundzero

Technology from the front lines.



Quest for physicality

Daniel Rutter attempts the impossible.

Most nerds are starved for reality. Grit. Vividness. Dirty nails and grazed knuckles. A true Asperger's Syndrome case may crave not these things, but more normal humans do.

This, of course, is why so many nerds rock-climb and mountain-bike or, for those of us religiously opposed to strenuous exercise, build model cars and planes (R/C, naturally).

Sure, the gadgetry involved is fun, but the real juice of the thing is the physicality of it. The creation of something you can pick up makes a darn nice change.

I kind of miss having a real job. Real jobs involve doing physical things with physical objects. Whether you're flipping burgers, selling books or painting hot rods, you have things you can touch, kick and throw.

I don't have a real job. *My* job usually involves sitting in a chair and pushing a mouse. I mostly get to do things a lot more interesting than the average cubicle zombie, but the chair, mouse and lack of natural light are common factors.

It's pretty easy to tell when a fry-cook's working and when he's goofing off, but those of us who don't have real jobs can seem productive when we're actually just nodding on Everything2, or something.

Every cubicle-jockey worth their salt knows that you can get away with doing pretty much anything as long as you don't look *happy* about it. That could be the definition of a non-real job, actually; the job ain't real if your boss can be looking right at you and, if he can't see your screen, think you're working, when you're actually watching *Revenge of the Cybermen*.

After the first decade or so of this, you kind of want to *do* something. Preferably involving power tools Hence, case modding.

J. Random Nerd doesn't necessarily see any reason to start modifying his Corolla, but turning a boring beige business box into a disco-fever photon aquarium is quite another matter. That's a task of manageable dimensions, there's no heavy lifting, what small risk there is comes in nice neat Dremel-branded packages, and the result is a work of creativity. And then, there's under-pressure running repairs.

In one sense, it sucks when computers stop doing what they're meant to. Your dominion over your silicon-based serfs is imperfect. Your space-time continuum is fractured. Your fragile nerdy masculinity, assuming you for biological and/or temperamental reasons have some, is threatened. And fixing the problem is *important*. It's a production server. It's the box you do your work on. It's time for you to join your clan in a six-hour tournament.

This, of course, makes fixing the problem much more fun. When that machine that kept quitting tasks at random, blue-screening, and black-screening suddenly starts behaving itself when you kick its CPU voltage up 0.1V above stock and Blu-Tack a new fan in, it's like figuring out that last counter-intuitive problem in an Infocom game.

You haven't really *found* the problem, as such. You haven't reached a truly elegant solution. But everything *is* working now. Your kung fu has triumphed.

There's satisfaction to be had from participating in a really hard-fought multiplayer game, or getting your file storage schemas really *just so*, or from finally getting a site to render perfectly in 16 different browsers.

But you don't get the same satisfaction from looking at smoothly flowing LAN traffic as you get from looking at, say, your new scratch-built R/C warbird.

Especially as you know, for a fact, that the warbird has at least as many invisible faults as the LAN, which are similarly just waiting for the right combination of circumstances to deliver you into frustration. And possibly deliver the plane into the ground.

When virtual reality finally goes all Gibsonian on us, fixing LANs will be this much fun.

In the meantime, though, that workbench in the garage is a sanity-saver.

Invite Dan to your party!
He does balloon animals!
dan@atomicmpc.com.au

A true Asperger's Syndrome case may crave not these things, but more normal humans do.

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www.gecube.com

GRAPHICS BY ATI

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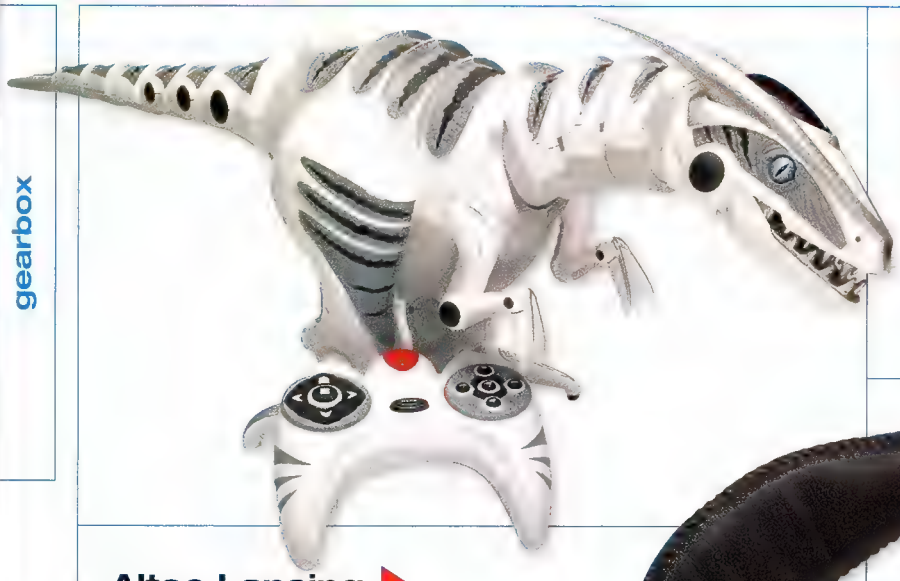


Roboraptor

Supplier Major toy resellers
Website www.roboraptoronline.com
Price $179

Who needs pet dogs and cats when you can have your own robot velociraptor running around? Sure, it doesn't really do much apart from looking cool, and it'd be nice to see it rend flesh from bone every now and then, but if you want a funky robot in the vein of the Robosapien, this is the slickest machine on the block. A brownie point winner as a gift for the kids.

Altec Lansing AHS602SRS headphones

Supplier Innovision
Website www.innovision.com **Price** $99

Headphones are pretty much standard issue on gamers these days. Thing is, you can get headphones designed specifically for gamers. Yeah. The AHS602 set shown here perform decently, supporting SRS (surround sound) and a microphone. It also has passive noise reduction, otherwise known as 'foam'. We noted however that the headphones were strangely uncomfortable to wear. We finally tracked this down to the somewhat small ear cups. A great buy for leprechauns and gnomes.

Delta TFB1212GHE

Supplier PC Case Gear
Website www.pccasegear.com.au **Price** $35

We weren't too sure what to expect from this chunky Delta fan. Everyone knows Delta has a reputation for designing fans better suited for service on a hovercraft than inside a PC. So we weren't surprised when the TFB1212GHE whirred to life and blew poor Nathan over. As it drank from the 12V rail of our test PSU, you could feel, hear and even taste its raw 200cfm performance. It was loud, but not as loud as we expected it to be. In a word – awesome.

AirTouch Keyboard

Supplier PC Case Gear
Website www.pccasegear.com.au
Price $49

Just for a laugh we used the AirTouch Keyboard to do this review. Let's go over the experience. Firstly, the reviewer's modest type rate plummeted from a 71wpm to 15wpm; the capital 'T' in 'AirTouch' never came out as a capital on the first attempt and from time to time he would hit tne Caps Lock key, turning the current sentence into a temporary shout-fest. Not to mention the pain in both hand and wrist after its completion. A bendy wendy novelty that doubles as a keyboard.

▲ Pyramat

Supplier Pyramat
Website www.pyramat.com
Price $199.95

The Pyramat is a standard floor mat equipped with speakers and sub-woofer. Although nice, the cushions could be wider, and we're not totally convinced that having a speaker and sub-woofer directly next to your head while you play *Rocking the Suburbs* is entirely healthy. Nonetheless, if you feel the need to be closer to your favourite band and your back's giving you pain in spades, then the Pyramat might just be for you.

▲ Wireless PC Lock

Supplier Anywhere **Website** www.anywhere.com.au **Price** $79.95

There's only one way to ensure your siblings don't find your secret MacGyver MPEG collection – lock your machine down tighter than a chastity belt. Only, they don't make chastity belts for computers, but they do make this wireless PC lock: attach the USB dongle to your PC, install the drivers, and keep ahold of the keyring sized transmitter. When you walk away, the PC will automaticaly lock, and unlock again when you return. Neato!

▼ Atari Flashback

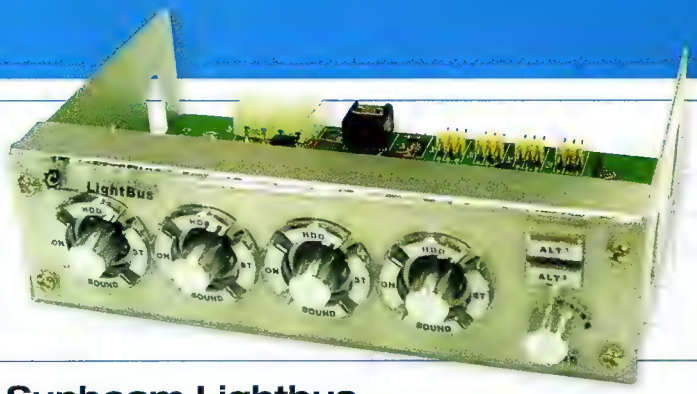
Supplier Atari **Website** www.atari.com.au **Price** $79.95

Remember when Asteriods was, like, the best game ever? No? Well now is the perfect opportunity to find out why it was (and isn't now). Atari has packed 20 of its classics into a tiny box that wouldn't look out of place on the bridge of the original starship Enterprise, along with two controllers so you and your only friend can enjoy those amazing titles that 'defined a generation'. Just expect to be heckled by brother when he comes home and demands to play Splinter Cell on his Xbox.

▲ TunePower Battery Pack

Supplier Belkin
Website www.belkin.com.au
Price $169.95

Music is life. Life is music. Well, for as long as it lasts. There's nothing more annoying than having the music cut short as the battery dies on your iPod. So what to do? Belkin has the answer – a sleek rubber clip-on battery back that extends the life of your iPod by another eight to ten hours. And it's rechargeable, too. Never be without your music again!



Sunbeam Lightbus

Supplier XCOM Technology **Website** www.xcom.com.au **Price** $35

This is, of course, just another rheobus, but in the true nature of Sunbeam, they've added a sound sensitivity module for a mode that has your lights dancing to your sound card's output – or even to your HDD activity. If these guys are to be believed, with their hip 'art, passion and sunbeam' saying, you can add up to 625 effects with existent lights in your box. This fella features four three-pin power channels and several modes. Get this and do as the box demands – 'enjoy the wonderful light world'. Cute.

Turbo-Cool 850 SSI

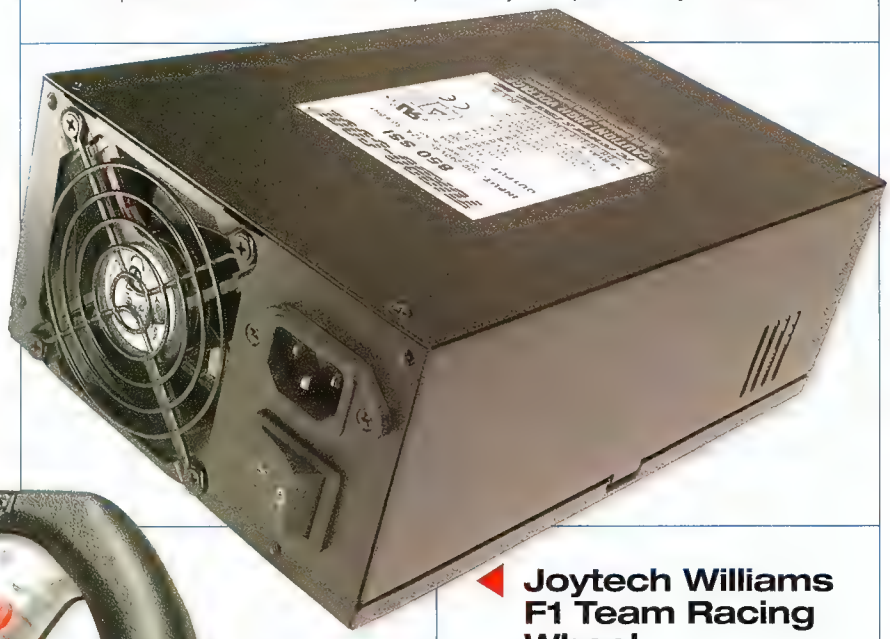
Supplier PC Case Gear **Website** www.pccasegear.com.au **Price** $680

Looking for a high-capacity power supply? Like a two-in-one kind of high? This bad arse mega pumping electro juicer is just what you're after, with a continuous rate of 850W, it peaks at 950W. Gasp. This is what you want if you're running four CPUs with a dozen hard drives, ten optical drives, overclocked and peltier-cooled SLI video card setup and 8GB of high-performance memory. Either that, or you could give everyone that impression. With SATA and ATX 24-pin, it's fully futureproofed. Beyond awesome.

Antec Titan 550 Case with 550W

Supplier PC Case Gear
Website www.pccasegear.com.au
Price $299

This case is ideal for server situations, with drive space for up to seven 3.5in hard drives and enough room for a potato farm. Speaking of server, it also supports server-size mobos, such as dual-Xeon or Opteron setups, with support for up to extended ATX size. Which should go to explain the depth of this incredibly large box, at 58.4cm. Definitely plenty of decent air ventilation and almost enough room for it to create its own atmoshpere. In what seems to be a rarity, this case also sports a PSU, and a decent TruePower 550W on at that.



Joytech Williams F1 Team Racing Wheel

Supplier Joytech
Website www.joytech.net
Price $TBA

If you can keep a car on the digital road, this smooth handler is for you. With pedals that swivel back (though they were too close together for this reviewer) and a rubber grip steering wheel that has a decent force feedback driver behind it, this it ready for some good Playstation 1/2 driving games. This baby can sit on a bench or your legs with separate attachments. The wheel even has an array of LEDs that light up.

Ministry of Sound StikAx

Supplier PC Case Gear
Website pccasegear.com.au
Price $149

Feel like being a DJ in the comfort of your own home... you know, mixing loops to the sound of your mum making dinner, or your brother making sweet love to his pillow? Then the StikAx is the mixer for you. Along with the utterly uncomfortable hand unit that looks like it was designed solely for use by General Grievous, you'll get a software CD and a CD full of loops. Time to start jamming, my man (or woman).

Pure AV home theatre surge protector

Supplier Belkin **Website** www.belkin.com.au **Price** $189.95

Everyone should have a surge protector, if only so they can say 'Hey, I have a *surge* protector, baby' to potential bed buddies at bars, clubs and train stations. Seriously though, if you have a multi-thousand dollar HT setup, you would do well to defend it from electrical nasties with this eight-plug behemoth, and with a $275,000 connected equipment warranty, why wouldn't you? As an added bonus, it can protect your phone and ADSL/cable connections too. The simplest ideas are always the best.

Notebook Dock + Cooler

Supplier Anywhere
Website www.anywhere.com.au
Price $74

The underside proclaims 'Just be rich and cool with your notebook'. Um, Ok. The idea is sound at least – two fans in the slimline dock draw heat out from the underside of your notebook and vent it out the back. To make it more useful, the dock also comes with a memory card reader, and three USB 2.0 ports, though you need to plug in a USB cable from the notebook to power these. Overall a nice idea, but not an essential piece of kit.

BILL'S REVIEW! COR!

Belkin Classic Leather case for the iPod Shuffle

Supplier: Belkin
Website: www.belkin.com.au **Price:** $39.95

I draw pictures not write words you bastards! Bill the designer here – this is my first review for *Atomic*, and the lads have given me the smallest product of the roundup (trying to tell me something?)

Anyway, it's this Belkin Classic Leather case for the iPod Shuffle! You get three in a pack – black, red and white – to suit your lack of dress sense and while it looks cool and all it does make it a little harder to operate the controls. Comes with a D-ring too (for lanyards and keychains and crap). All up a good way to protect your Shuffle from psychotic monkeys... and those bastards in editorial. *(Ed - Ha!)*

827-001 LiteOn - Atomic A4

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DVD Burner - Double Layer (16x)

Model (internal)	SOHW-1673S (double layer)		SOHW-1693S (double layer)	
DVD Family	DVD +	RW	DVD +	RW
Type	[+]	[-]	[+]	[-]
Write	16x	16x	16x	16x
Rewrite	8x	6x	8x	6x
Read	16x	16x	16x	16x
CD Family	CD-RW			
Write	48x			
Rewrite	24x			
Read	48x			
Data Buffer Memory	2MB			
Support Media	DVD: DVD single/dual layer (PTP/OTP), DVD-R, DVD+R, 4x Double Layer DVD+R9, DVD-RW, DVD+RW | CD: All CD-ROM/R/RW formats		DVD: DVD single/dual layer (PTP/OTP), DVD-R, DVD+R, 4x Double Layer DVD±R9, DVD-RW, DVD+RW | CD: All CD-ROM/R/RW formats	

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head head

Bite-sized comparative round-ups of the hottest gear

I want my HDTV

Bennett Ring does battle with eight TV tuners... right after this commercial break.

That age old of dilemma of summoning up the energy to haul your lazy arse from the PC to the couch has been solved in recent times with the advent of digital TV tuners.

These days you can slave away at your keyboard, typing out what you believe to be witty remarks on MSN while at the same time watch a doco on the ABC about some Henry dude who used to be a King. And you don't even need to waste any precious body power to divert your eyes from your monitor to the telly thanks to the TV tuner. Magic!

While PC TV tuners aren't really that new anymore, they've morphed from the low resolution standard-definition components from a year or two ago, which had more bugs than a backpacker with dreadlocks, into High-Definition, easy to use, PVR-enabled wonder cards. After taking eight of the latest PC tuners for a test drive, we can't stop chuckling about consumers who are happy to fork out anywhere between $600 and $1400 for a set-top box, when these cards can do the exact same job, if not better, for a fraction of the cost.

So, you want to get your *Desperate Housewives* fix on the PC? What should you look for? For starters, you'll have to choose between a PCI or USB version. We'd recommend going for PCI variant, as being an Atomican slotting in one of these cards isn't beyond your tweaking skills. They tend to be a little cheaper than the USB variants, and won't suck up one of your USB 2.0 ports. However, there's something to be said for the simplicity of installing a tuner without ever having to remove your PC case. If you're going to be viewing the tuner from afar, a remote control will also come in handy, although a long pole has been known to do the job just as well.

If your theatre PC isn't the most powerful beast around, try to find a tuner card which supports DxVA – this is an acceleration technique that offloads the job from your CPU. However, this requires a video card that supports DxVA, and in this area NVIDIA seems to have the upper-hand over ATI.

Although the hardware for these devices is all very similar, based around a handful of tuners, the software can make or break your experience. However, if you choose a tuner which has support for BDA drivers it means you won't be stuck with the included software – there is a wealth of third-party software created for BDA-compatible devices.

How we tested

Compared to the benchmarks we usually run, testing these devices was even simpler than Apple's decision to use Intel chips over IBM's. It was a matter of installing the device, scanning for channels, then kicking back to watch some *Ally McBeal* repeats over some fresh popcorn, and occasionally firing up the PVR functionality and other assorted features built into each tuner. Luckily we were in an area with excellent digital TV reception, so if there were any problems with reception, we knew it was the fault of the card and not the signal. The machine used for testing was an AMD Athlon 64 3400+ with 1GB of DDR400, ATI RADEON X850XT and a SoundBlaster Audigy 2 Platinum eX. Mmm... popcorn.

TechnoTrend TV stick

Price **$269** Supplier **www.dpanda.com.au** Website **www.technotrend.de**

It's hard to believe that this device is a fully-fledged HDTV tuner. At the same size as a USB thumb drive this is the ultimate in portable HDTV tuners. On one end is the USB 2.0 port, necessary for the high bandwidth of HDTV (USB 1.0 only supports SDTV tuners), while on the other is a simple RF input. Setting it up couldn't have been easier – plug it in, let it auto-install the drivers and then install the included interface. The auto-channel scan successfully picked up every single digital TV and radio station, which many of the larger units struggled with. Reception was impeccable, with nary a hiccup or stutter in sight. AC3 audio over S/PDIF worked perfectly, as did 5.1-channel sound over our PC's SoundBlaster sound card.

RATING ■■■■□

AVLabs In-Vision PCI Digital TV tuner

Price **$199** Supplier **www.innovision.com.au** Product **www.avlabs.net**

Watching TV on your computer is great and all, but it's handy if you have sound to go with it. Unfortunately we were unable to get the sound on this budget-priced card to work at all. Which was a shame, as it was an otherwise very solid unit. The picture quality was great, while support for DxVA means that users with lower-specced CPUs should still get smooth framerates, provided their video card supports this acceleration technology. It even uses DBA-compatible drivers, and the PVR functionality worked perfectly. It also has composite and S-Video in, allowing you to capture video. Overall a good card, but the poor manuals didn't help us overcome the sound problems.

RATING ■■□□□

V-Stream DVB-T USB

Price **$275** Supplier **www.lakopacific.com.au** Product **www.lakopacific.com.au**

It just goes to show how few manufacturers there are in the TV tuner world. Much like optical drives, it appears that most TV tuners are all based around the same hardware, which is then repackaged and given proprietary software. Take this USB box for example – it shares the exact same remote as the AVLabs TV tuner. So it was no surprise to see that the performance of this USB box was identical to that of the AVLabs card, although this time around it actually had sound working out of the box. In fact, it even had the same software – which unfortunately was some of the worst we've seen when it comes to being intuitive or attractive. Still, at least the PVR functionality worked well.

RATING ■■◪□□

DVICO Fusion HDTV USB DVB-T

Price **$299** Supplier **www.lakopacific.com.au** Product **www.dvico.com**

First impressions of this tuner weren't exactly promising. While it installed without any problems, the auto tuning didn't seem to work too well at all. Consulting the manual didn't help, so we resigned ourselves to having to manually enter the frequencies for the stations. Thankfully a bit of mucking about in the options area soon opened up the other channels. However the image quality was poor – this thing was jumping around more than an ADHD kid dosed up on a litre of red cordial. A quick jump to the DVICO website to grab the latest software, and what a difference! The newer build uses a new decoding engine, and the result is crisp and sharp TV bliss.

RATING ■■■□□

DigiTV USB with Nebula Electronics remote control

Price **$259** Supplier **www.hyperreality.com.au** Product **www.nebula-electronics.com**

Considering the love we've felt for Nebula products in the past, it was hard not to be disappointed with the DigiTV USB. While the install was as smooth as silk, and channel scanning was one of the quickest on offer, from there it was all downhill. For starters, the software is buggy, not supporting 5.1-channel sound over your sound card. S/PDIF sound worked fine, but not every PC user has a Dolby decoder hooked up to their PC's speakers. The PVR functionality was a little hit and miss, giving errors that weren't explained anywhere in the manual. The only redeeming feature is its full support for the online EPG found at **www.icetv.com.au** – but this will set you back three bucks a week!

RATING ■■◪□□

DigiTV PCI with Nebula Electronics remote control

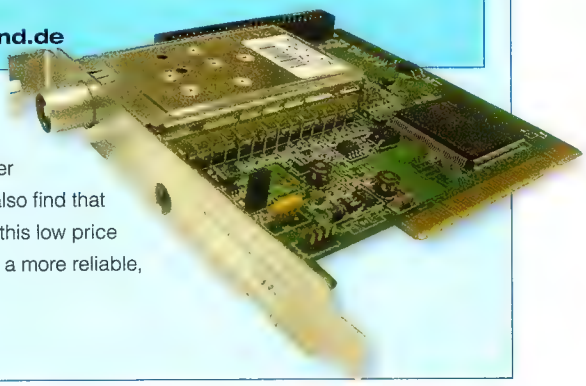
Price **$249** Supplier **www.hyperreality.com.au** Product **www.nebula-electronics.com**

This unit is exactly the same as the USB version, with the exception that it's a PCI card rather than an external box. As such it shares the same limitations as its USB brother. Once again the sound didn't work properly, but this is supposed to be fixed in an upcoming release of the card's software. We'll believe it when we see it. Stuttering was also present when any of the controls were manipulated, even when simply changing the volume. It was also very unstable, with the application crashing several times during use. As such, we'd recommend holding off on purchasing this product until the software has matured. At least the price includes a remote control...

RATING

TechnoTrend T-1500

Price **$239** Supplier **www.dpanda.com.au** Product **www.technotrend.de**

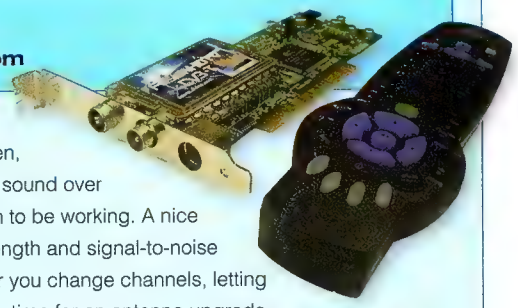


This card appears to be very similar to the TV-Stick from the same company, but in a PCI format. It uses the exact same software, which is easy-to-use but not the prettiest we've seen, and is just as quick to install as its tiny companion. Channel scanning took a good five minutes, but considering you'll only need to do this the first time you install it, it's not a problem. It managed to pick up every channel without any dramas, including digital radio stations. Those with lower signal-to-noise ratios should also find that this card will do them well. At this low price you'd be hard-pressed to find a more reliable, DBA-compatible device.

RATING

DVICO FusionHDTV Plus

Price: **$249** Supplier: **www.lakopacific.com.au** Product **www.dvico.com**



By the time we tested this card, we were starting to notice a trend – when a manufacturer makes both a PCI and USB version of a product, it's nearly identical. This PCI card is very similar to the FusionHDTV USB product, right down to the software in use. However, this card didn't need a software upgrade – the included software worked perfectly fine, without the stuttering seen in the USB version's software. It also includes the same remote control of its brethren, but we noticed that the 5.1 sound over the sound card didn't seem to be working. A nice touch is the way signal strength and signal-to-noise ratio is displayed whenever you change channels, letting you know whether or not it's time for an antenna upgrade.

RATING

Conclusion

Digital TV is, of course, the all dancing all super-sharp quality wave of the future, and while it's satisfying to see so many manufacturers come onto the market with a range of PCI and USB based tuners to use with your PC, it's disappointing that we found so many problems with quality and configuration. Clearly, for the moment, there's more work to be done in this arena, but it doesn't mean you can't watch crystal clear digital television right here, right now. Just shop around when you're looking for a card, go with a brand that's formed a good reputation, and be sure to check out the software package carefully, as more often than not this has a greater impact on the functionality of the card than the tuners built into them.

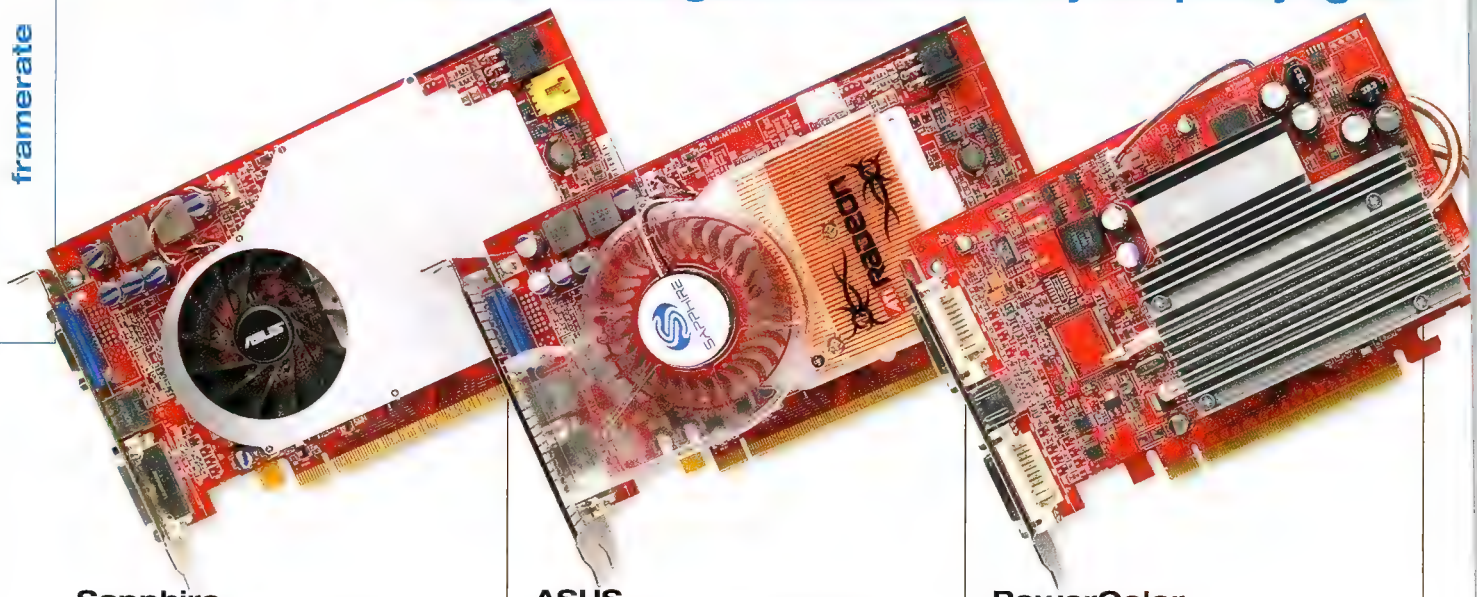
Something to consider also is the strength of the incoming signal in your home – the more TVs and PCs you hook up to your feed the greater the drain. If you're splitting the signal between a TV and your PC, you might want to invest in powered signal splitter that can also amplify the signal and thus ensure each device gets a full strength signal coming in – handy if you live a little further in the burbs.

Finally, if you're looking to use one of these solutions in your own PVR or home theatre box, and you're a fan of Linux based MythTV or Freevo, be aware that while analogue TV tuners have good support in Linux, digital TV support is still relatively new and can be a real pain to get working. Your best bet for digital TV support at the moment is Windows, so build such a system around MCE if you can.

PC based TV is definitely fun to play around with, and digital TV combined with a quality LCD monitor can provide a far better experience than your humble TV. Get into it!

framerate

Nathan Davis gets mesmerised by the pretty lights.



Sapphire RADEON X850 XT

GPU **ATI RADEON X850 XT**
Memory size **256MB**
Core clock **520MHz**
Effective memory clock **1080MHz**
Memory type **256-bit GDDR3**
Pixel pipelines **16**
Vertex shaders **6**
Video in **None**
Video out **DVI; D-Sub; component; composite; S-Video**
Price **$949**
Supplier **Achieva**
Website **www.achieva.com.au**

Sporting all the outputs you'll ever need, this card will satiate the desire to splash out all kinds of video. It doesn't have video-in, but that's a bonus these days and this card is powerful enough to stand on its own two feet without having to worry about packing on the features. Don't let the fact that it's a quiet performer deceive as this is one spicy two-expansion-slot-stealing video card. If you're after some clean, fast and crisp graphics, you'll yearn for this feisty and relatively cool-running card.

ASUS Extreme AX850PRO

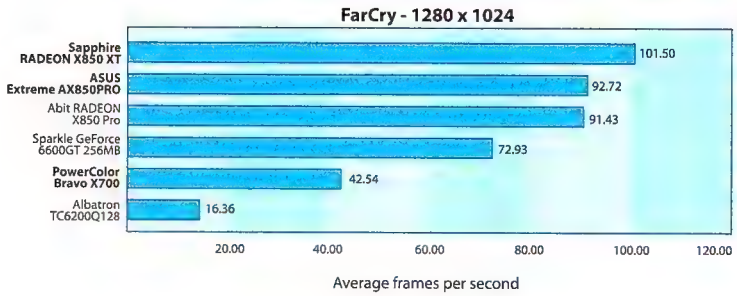
GPU **ATI RADEON X850 Pro**
Memory size **256MB**
Core clock **506MHz**
Effective memory clock **1040MHz**
Memory type **256-bit GDDR3**
Pixel pipelines **12**
Vertex shaders **6**
Video in **S-Video; composite**
Video out **DVI; D-Sub; component; composite; S-Video**
Price **$779**
Supplier **ASUS**
Website **www.asus.com.tw**

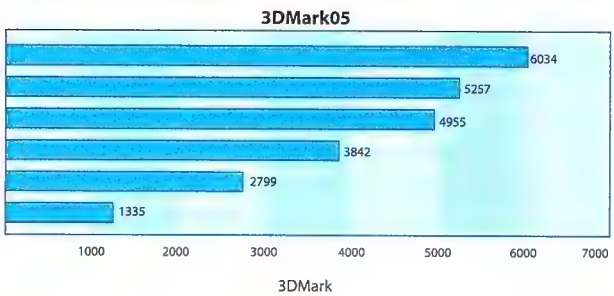
Equipped with video-in, it's not quite as fast as, say, the X850 XT on the left, but this is for those who are after features and not necessarily the fastest, loudest, meanest, blazing redneck of a video card on the street. However, even though this is basically a cut-down version of the X850 XT chip with 4 disabled pixel pipelines, it does come close to being as quick. Only it's quieter and runs cooler. The new fan design sees this sucker drastically reduced in the auditory department, with barely a hint of a 'whiz'.

PowerColor Bravo X700

GPU **ATI RADEON X700**
Memory size **256MB**
Core clock **400MHz**
Effective memory clock **535MHz**
Memory type **128-bit DDR**
Pixel pipelines **8**
Vertex shaders **6**
Video in **None**
Video out **DVI; D-Sub; component; composite; S-Video**
Price **$220**
Supplier **Australia IT**
Website **www.australiait.com.au**

As much as the image both here and on the box might suggest, this card is not passive, but rather PowerColor has opted to route the heat from the currently visible side to the other side via two copper heatpipes. The other side of which has a rather small yet surprisingly audible fan, sitting on top of another larger heatsink, buzzing away. This card would make a top 3D foundation for a budget gaming beast or even a home theatre PC with a small dollop of gaming in the sights, as it does have component outputs.



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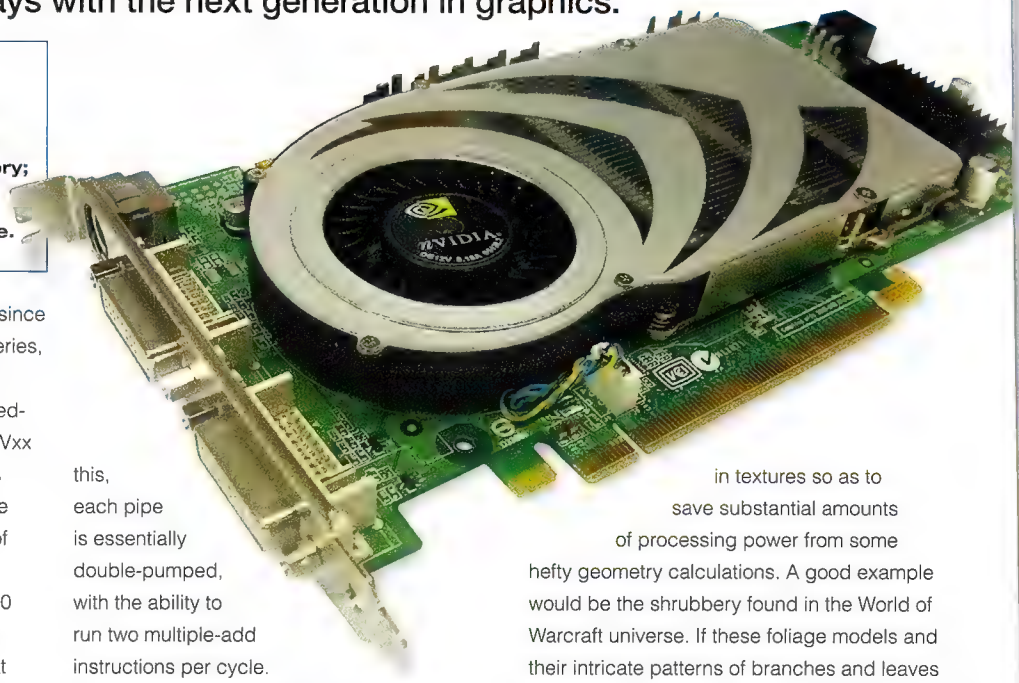
NVIDIA GeForce 7800 GTX

Nathan Davis fondly plays with the next generation in graphics.

specs

Price **$TBA**
Supplier **NVIDIA**
Website **www.nvidia.com**
Specifications **Native x16 PCI Express; 430MHz core; 256MB 1400MHz 256-bit GDDR3 memory; 24 pixel pipelines; 8 vertex shaders; Shader Model 3.0; PureVideo; dual-DVI; SLI capable.**

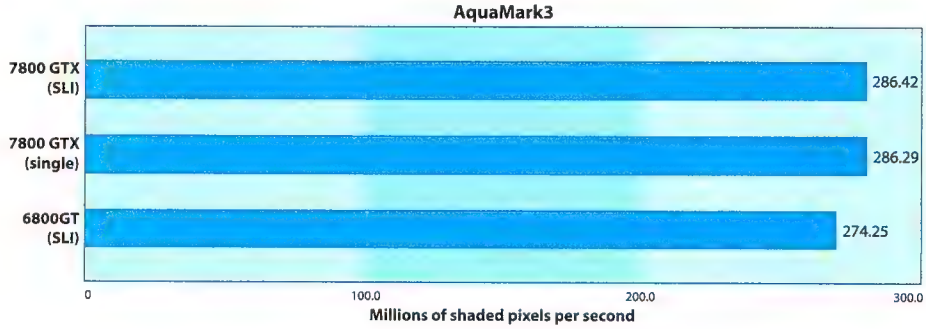


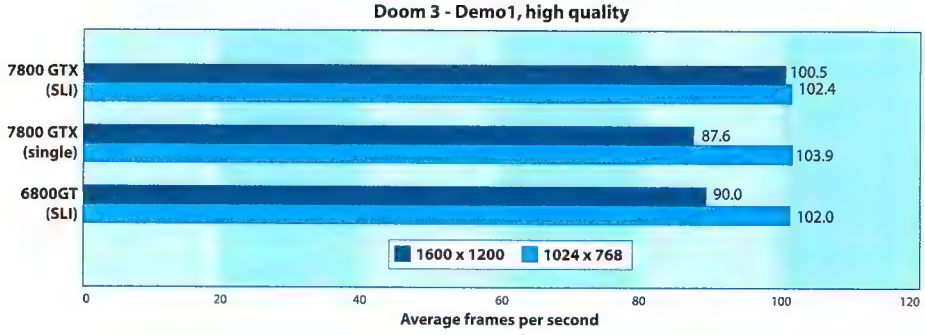
With little over a year having passed since the release of the powerful NV40 series, with Shader Model 3.0, NVIDIA's new chip has arrived in the form of the Apple-flavoured-codename 'G70' – a move away from the NVxx naming scheme. More commonly known as the 'GeForce 7800 GTX', this chip marks the beginning of NVIDIA's seventh generation of video cards.

For comparison's sake, the standard 6800 Ultra has a 425MHz core clock speed with 256-bit GDDR3 memory modules running at 1100MHz. The 7800 GTX has a tiny 5MHz increase on that, with a core clock at 430MHz and a relatively decent 300MHz increase in memory speed to 1400MHz, also with 256-bit GDDR3 modules. These numbers aren't that much of a leap, however it's in the pipelines where the magic is. The 6800 Ultra has six vertex shaders and, like most current high-end cards, sixteen pixel pipelines. On the other hand, the 7800 GTX has twenty-four pixel pipelines and eight vertex shaders. On top of this, each pipe is essentially double-pumped, with the ability to run two multiple-add instructions per cycle.

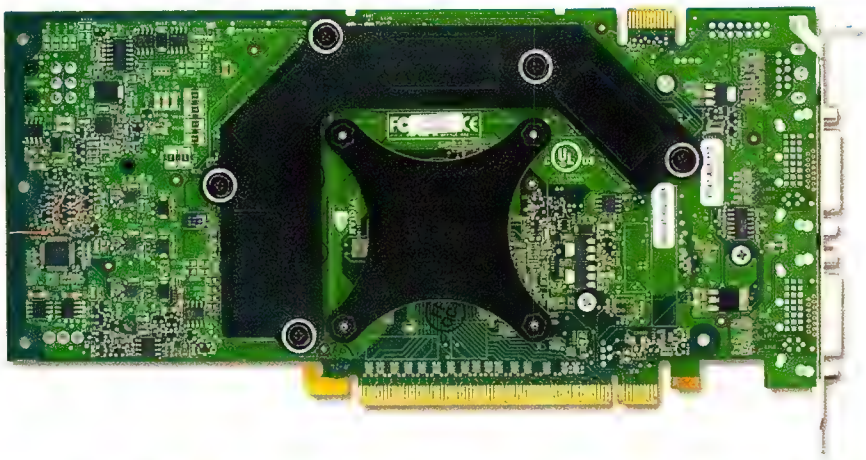
One particular technological update that grabbed our interest was an addition to antialiasing. In the past, AA hasn't smoothed over the edges of transparent textures, as they only looked for the edges of geometry, not alpha channels in textures. 'Transparency AA' is now an option, and textures that have an alpha channel can also have the jaggies within the texture smoothed out.

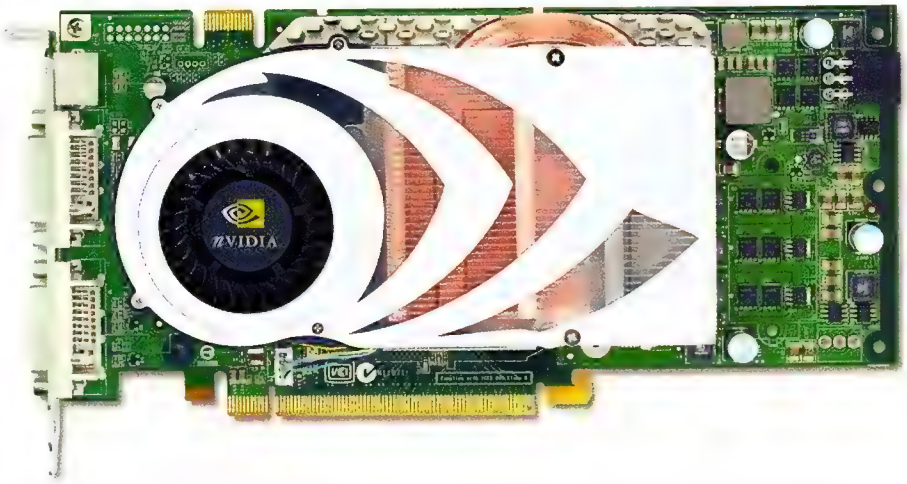
This is fantastic news for games where many high-detail worlds use alpha channels in textures so as to save substantial amounts of processing power from some hefty geometry calculations. A good example would be the shrubbery found in the World of Warcraft universe. If these foliage models and their intricate patterns of branches and leaves consisted of geometry alone, a few of these beasts would likely have your machine on its hands and knees begging to be put down. Instead they are made up of merely several polygons covered in a texture that appears to have holes in it, or alpha channels. Until NVIDIA came up with Transparency AA, the edges of these 'holes' often have a bad case of aliasing, though developers minimised it as much as possible. Transparency AA basically comes along and antialiases these 'sub edges' on the texture itself and merges them with the scenery behind. An absolutely ingenious method at





'Transparency AA' is now an option, and textures that have an alpha channel can also have the jaggies within the texture smoothed out.



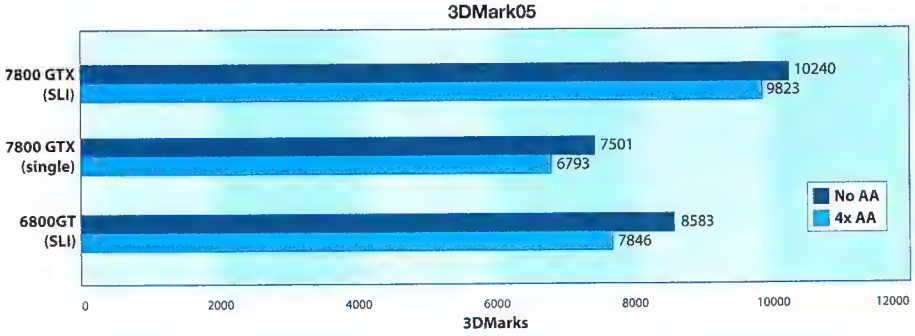


making the environment look prettier.

The drivers we used for the 6800GT and the 7800 GTX were different, as we tested the 6800GT just prior to getting access to the 7800 GTX. We used the Forceware 71.89 WHQL certified driver for the 6800GTs and the only driver set that would work on the 7800 GTXs, the non-WHQL certified Forceware 77.62. All texture and filtering 'optimisations' were disabled, except for Depth Stencil Texture under 3DMark05, as the difference between the two is subjective, yet an obvious speed increase is inherent with it on. NVIDIA is happy to reduce the quality of its shadows and we're not going to stop it, and as such this is something a prospective buyer should be aware of, as the performance does drop quite significantly with DST switched off.

To test the new batch of available pipelines, we whipped out our copy of AquaMark3, loaded up the Pixel Performance Measurement test and got pleasing results, with the 7800 GTX pulling ahead by over twelve million more shaded pixels per second. Judging by the results, it's reasonable to suggest that SLI has no effect on AquaMark3.

For real-world performance, we loaded up Doom 3 and the results were startlingly good. We may have hit a bottleneck but this proves the card is nothing to be sneezed at. Particularly given that at 1600 x 1200, with *one* card, it performs on par with *two* 6800GTs in SLI. The performance slightly decreased in SLI mode, with a single GeForce 7800 GTX card spitting out barely a frame faster, but as we mentioned, this could be due to a software or testbench bottleneck. Suffice to say, the results are astounding and high resolutions is where it pulls well ahead.



Finishing up on 3DMark05, we finally saw the 10,000-3DMark barrier smashed down, with AA barely affecting the performance, thanks to the efficiency of multi/super-sampling.

Even though this is an engineering sample, the fan noise was so quiet we had to push our ear almost right against it to hear it. Running two of these is of little concern to the auditory system, as they're silent in comparison to two 6800GTs/Ultras.

With the heat of ATI's CrossFire in sight, it will be very interesting to see how the two dual-card solutions stack up against each other. Currently, all of NVIDIA's SLI cards must be exactly the same brand, right down to the BIOS version in order to function correctly.

On the other hand, CrossFire will be capable of supporting completely different cards, making the upgrade much easier down the line. Considering that BIOSs are updated fairly regularly, finding a card that has the exact same BIOS a year or so from the date of purchase is no easy task.

Luckily rumours suggest that NVIDIA may well soon lift the restriction – in response to ATI, no doubt.

Overall, the GeForce 7800 GTX is the most powerful card we've come across to date. And this time it's more than just a MHz refresh – the new design behind the G70 is impressive and packs a hell of a performance punch. Consider as well the driver improvements and tweaks to come in the future, along with support from developers, and it's easy to see that the G70 is well on its way to owning the video card scene. Well, until ATI brings out its next-gen chip.

It will be interesting to see what additional features manufacturers will offer with this workhorse, as that will be the decision maker in choosing one brand over another, as has been the way since the days of the GeForce3.

If you want the fastest card available right now, the GeForce 7800 GTX should be hitting the shelves by the time you read this. Expect it to feed on the soul of your wallet, and that of your wallet's children.

atomic PREVIEW

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This device is protected by the following patents: China Patent No. ZL200420008943.0 Taiwan Patent No. 56525 One or more pending U.S. patent applications

Western Digital WD2500KS Caviar

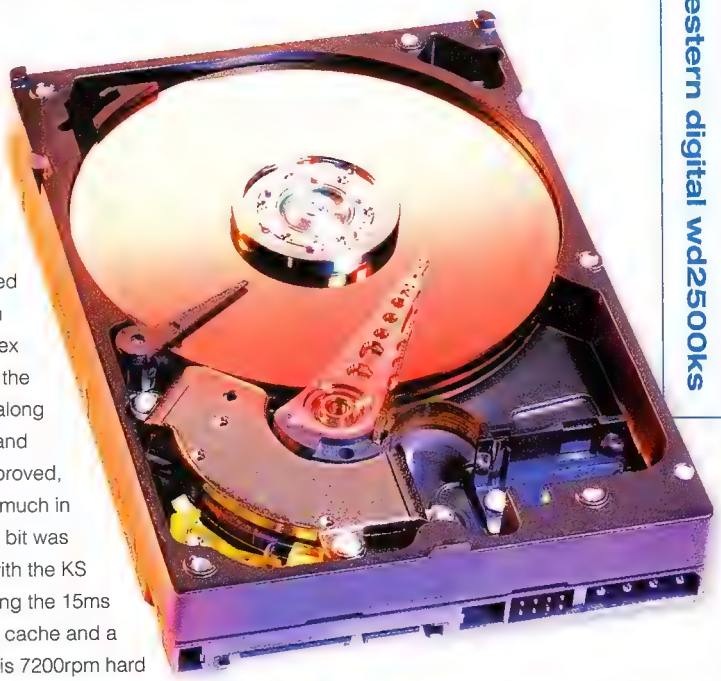
specs

Price **$265**
Supplier **Western Digital**
Website **www.westerndigital.com.au**
Specifications **250GB SATA II HDD; 16MB cache; 7200rpm; Native Command Queuing; three platters; six heads.**

Renown for creating the world's first form of caviar that almost everyone can enjoy, this new three platters worth of fish eggs sports the next generation of SATA.

The interface supports up to 300MB/s, but considering how the original SATA drives hardly came close to their 150MB/s theoretical rate, this is what we in the biz call 'WTF marketing'. To dispel a myth, a common mistake is for people to believe that any SATA II drive is capable of 300MB/s. This isn't true. This idea stems from a committee called 'SATA II' (now known as 'SATA-IO') who defined the 300MB/s capability as one new capability for next-gen SATA drives.

SATA II brings an assortment of capabilities such as port multipliers (up to 15 drives per port) and true hot-plug capability, however at least one of two abilities must be true in order for a drive to be listed as being SATA II; it must have either Native Command Queuing or a transfer speed of 300MB/s.



This beast sports both, so for testing we armed up our 512MB DDR400, Athlon 3500+ system and compared it against the WD2500JD. In SiSoft Sandra, the drive index for the JD was 48MB/s with the Western Digital KS pacing along at 53MB/s. Buffered reads and writes were significantly improved, but you're not going to see much in general drive use. The best bit was the average access time, with the KS scoring 6ms and slaughtering the 15ms of the JD. Packing 16MB of cache and a 250GB storage capacity, this 7200rpm hard drive is, theoretically at least, well-equipped for some high-end Desktop storage. If you like being on top of technology and just having the best toys, this drive just might be your catch.

ND

score 8.0 OUT OF 10

Logitech MX518 Gaming-Grade Optical Mouse

specs

Price **$99.95**
Supplier **Logitech**
Website **www.logitech.com**
Specifications **5.8 megapixels/s; Res: 1600-dpi native, adjustable to 400- and 800-dpi; 16 bit/axis USB data format**

The new MX518 shares the same wonderful shell design as the MX 5x, 7x and 1000 series meeces. Many of us at *Atomic* have used one or another of these for years and through work and gaming they are comfortable and extremely durable.

The MX518 has the same tortoise-shell plastic cover as the MX510, but it's grey instead of red or blue, and we have to say we prefered the look of the MX510.

Inside is where the MX518 shines though. Literally. Its optical sensor is pumped up to 1600-dpi resolution. That's double the MX510. Not only that, but you can also run it at 400- and 800- dpi, and the beautiful thing is that you can select any of these settings on the fly by hitting the + or – buttons on top of the mouse. Best of all, you don't need to install any drivers to do this. Tidy. If you do install Logitech's drivers, you can choose from 5 dpi settings!

hotaward

In real world use, a higher setting means faster, more responsive movement. This isn't necessarily better. Different games and styles will work better at lower settings. In fact, it is perfectly possible to run at 1600-dpi in any FPS for fast twitch gaming – then, with a quick button press, drop down to 800-dpi for smooth precision when using a sniper scope. Some may find this fiddly, but it works a treat. If you're ready for a mouse upgrade, the MX518 highly recommended.

BM

score 9.0 OUT OF 10

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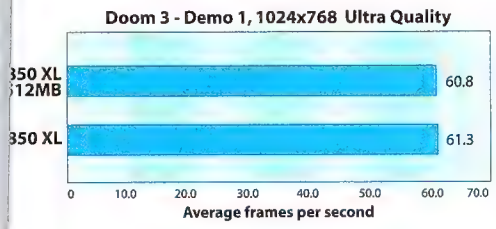
512MB Sapphire RADEON X800 XL

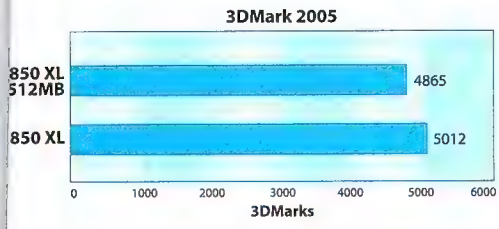
My schwartz is bigger than yours, says **Nathan Davis.**

specs

Price **$899**
Supplier **Achieva**
Website **www.achieva.com.au**
Specifications **ATI RADEON X800 XL; native x16 PCI Express; 400MHz core clock; 512MB 2ns 986MHz 256-bit GDDR3 memory; 16 pixel pipelines; 6 vertex shaders.**

Amidst all the excitement of the next-gen cards about to hit the shelves, there are still some decent happenings back in current-ville. We've all been waiting for a doubling in memory to happen, and it finally has occurred. Here we have a 512MB video card, and in the form of the new X800 XL.





The X800 XL is ATI's late safety net to the unpopularity and inherent low performance of the X800 chip. Aside from an extra two letters banged on the end as a suffix, the X800 XL has an additional four pixel pipelines switched on, bringing the count up to 16 – the same as the X850, however the frequencies have been dropped so as not to completely nullify the existence of the powerful X850 range. Naturally this really boosts the X800 and has it matching the 6800GT in terms of performance numbers – exactly where ATI wanted it. Normally these cards come with 256MB, though.

There are differences, however, between the standard RADEON X800 XL 256MB card and this Sapphire X800 XL 512MB card, apart from the inherently obvious. Firstly, the 512MB card requires the new 6-pin video power connector, most likely to power the additional RAM and generate a good dose more heat. As such, on top of that, it also uses a dual-expansion-slot profile for improved cooling, whereas the 256MB edition uses the much smaller single-slot profile, and with some RAM sinks on the rear memory modules.

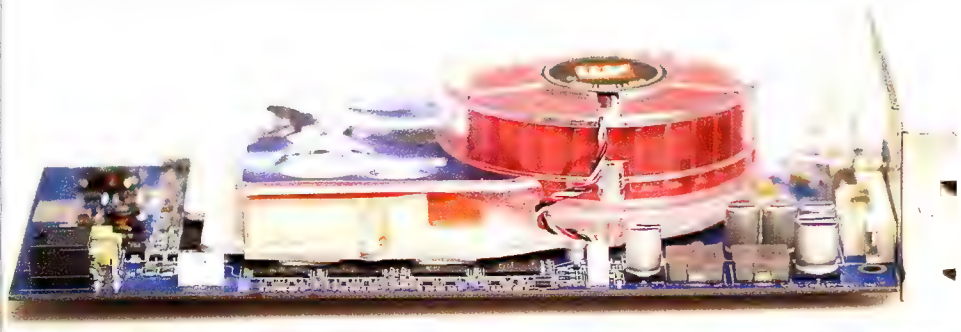
There are long-running discussions on whether doubling memory really helps the performance of a card. If the application that uses the video card's memory isn't loading nearly as many textures, it simply doesn't have a need for the additional memory. Thus, there should be no performance increase simply because the application doesn't use it. Slowly, however, there are games hitting the shelves that can apparently make use of these awesome increases in memory.

There are already existing means of doubling your video memory, however this usually comes in the form of SLI. The difference between 512MB on this and successive cards with 512MB on the one PCB is that the total memory bank is available to the graphics chip. In SLI, the memory is not shared between the two cards/cores, so the performance jump isn't as big as it could theoretically be, as there is a lot of cross-repetitive information. Slapping it into our Athlon 3500+ test bed shows that this card isn't ready to perform at its peak just yet – just as we expected. Many have found that even with 256MB cards, selecting Ultra Quality in Doom 3 increases the framerate a notch. Considering Doom 3's disappointing texture size, there's simply nothing left to fill memory with, beyond 256MB. As you can see, there was actually a minor reduction in frames outage. What's happening here is quite possibly a tiny amount of latency associated with having to address twice as much memory. Then again, it could also be due to the usual mild alteration factor between tests, even if using the exact same card.

What was startlingly surprising, however, was the slow down that exhibited itself quite remarkably in 3DMark05. We're just as stumped as you on this one.

As more of these babies come out and more games grow to support larger and more expansive textures, much unlike Doom 3, 512MB will quickly become the new enthusiast standard, just as 256MB did before it. That aside, Sapphire have themselves a neat card that isn't too loud, performs beautifully and packs on VIVO functionality.

Disregarding the performance results, get this card if you're going through a future-proofing stage. Otherwise, you might wish to play the waiting game and see what else crops up. Overall, a top package.



score 8.5 OUT OF 10

thermaltake cl-w0011

Thermaltake CL-W0011 Rocket

specs

Price **$85**
Supplier **Thermaltake**
Website **www.thermaltake.com.au**
Specifications **Cooling unit for Socket 478/T/A/939; 4.3kg 64cm anodised aluminium radiator/reservoir; 453g copper cooling block; 120L/hr pump**

Aside from looking suspiciously like a massive marital aid, this tall, aluminium-finned heatsink sits among the larger of the heatsinks we've checked out to date. It's clear that this is Thermaltake's take on reservoir cooling, because if you hadn't noticed the tubes, this unit also uses water/coolant.

Usually water cooling is a careful affair for obvious reasons, and Thermaltake's Rocket has a meticulously crafted cooling block and silent pump to ensure safe contact and smooth operation.

However, having left the Rocket running overnight, we discovered in the morning it had spilt forth its mighty green juice all over our benchtop, giving its once white surface a new shade of pulsating green. On close inspection, the base of the tower (the reservoir) appeared damaged and wasn't actually sealed-off properly. We contacted Thermaltake and they confirmed this was an anomaly, and likely a result of the unit being constantly shipped around as a review unit (or maybe it *had* been used as a marital aid afterall). Expect off the shelf units to work flawlessly.

And how well does it cool?

Not too shabbily, if we say so ourselves. Considering its passive cooling nature, it peaked at 54C load on Chernobyl at 80 watts – represnting 100 percent CPU usage – in 26C ambient. Not bad for a silent solution.

Indeed, add some airflow with a desk fan and you can improve on these results. While the Rocket does have a large surface area, airflow can always make a big difference.

Overall the all-aluminium Rocket is as much a status symbol as it is an efficient cooler. It's not exactly the type of thing that's easy to lug to LANs, but you can get get oohs and aahs out from your peers when they pop over for a fragging session.

If you're into cool temps *and* cool looks, the Rocket will suit you fine.

ND

score 7.0 OUT OF 10

gigabyte ga-81945p

Gigabyte GA-8I945P Pro

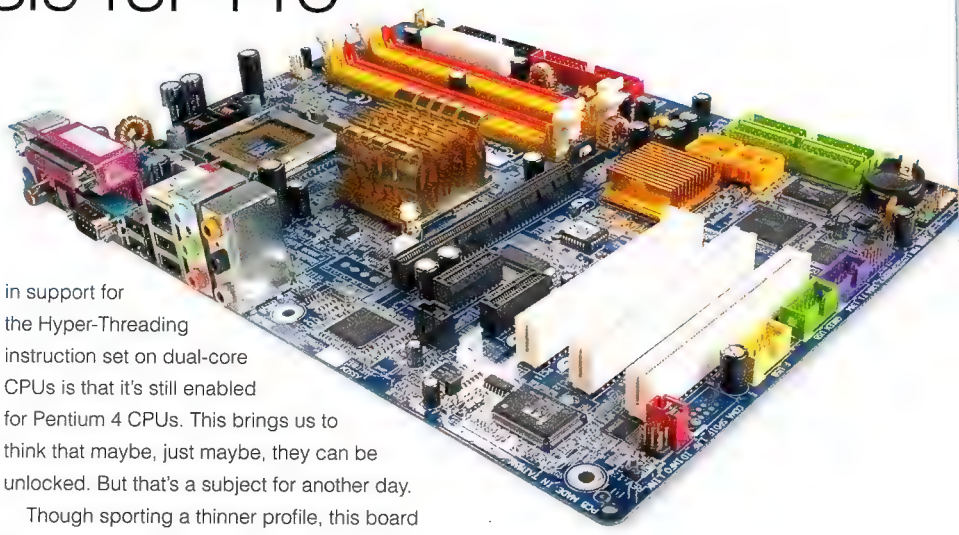
specs

Price **$230**
Supplier **Synnex**
Website **www.synnex.com.au**
Specifications **Intel 945P Express; 4x DDR2 DIMMs; 4x SATA; 3x PATA; 1x 16x PCI-E; 2x 1x PCI-E; 3x PCI; Gigabit Ethernet; 8-channel audio.**

Intel have come out with two new motherboard chipsets for the mainstream Socket T market in the flavour of the 945G and the 945P. This board is equipped with the 945P chip and the only difference between P and G is that G, funnily enough, has an onboard *graphics* processor. So units such as small barebones systems can take advantage of it. Though given the choice between an Intel graphics solution and a, say, RADEON 9200, we'd come screaming to the 9200.

These chips were made to support the new Pentium D dual-core processors. What this means is that the full potential of the new Pentium Extreme Edition CPUs will not be unleashed upon these. Hyper-Threading on dual-core CPUs will not work here, so if you're planning on grabbing a Pentium Extreme Edition processor, you'll want to look at a 955X motherboard. The odd thing about this lacking in support for the Hyper-Threading instruction set on dual-core CPUs is that it's still enabled for Pentium 4 CPUs. This brings us to think that maybe, just maybe, they can be unlocked. But that's a subject for another day.

Though sporting a thinner profile, this board is surprisingly full of features. It packs four SATA ports (second generation with new retention mechanisms), four DDR2 DIMM slots, one 16x PCI Express and two 1x PCI Express slots, three PATA ports, Gigabit Ethernet and optical out, this doesn't skimp at all on the feature set. For the cream on the cake, this baby comes equipped with Intel's delicious HD audio, laying to waste AC'97, coming in with eight channels at 192KHz/32-bit.



Nothing over the top, but if you're after a well-price mobo to go with your spankin' new Pentium D, this would make a top housing.

ND

score 8.5 OUT OF 10

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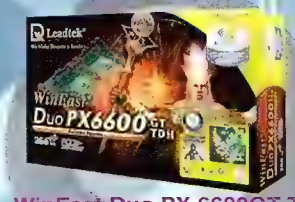
- 256MB/256 bit, high speed DDR3 memory
- Supports DVIx2 & TV out
- Supports Microsoft DirectX9.0c
- OpenGL 1.5



WinFast Duo PX 6600GT TDH

- nVidia GeForce 6600GT GPU x 2
- 256MB/256 bit, high speed DDR3 memory
- Supports DVIx2 & TV out
- Supports Microsoft DirectX9.0c
- OpenGL 1.5

NEW

WinFast PX6600 TD

- nVidia GeForce 6600 GPU
- 256MB/128 bit, high speed DDR memory
- Supports D-Sub, DVI & TV out
- Supports Microsoft DirectX9.0c
- OpenGL 1.5

WinFast PX6200 TC (Supporting 256MB)

- nVidia GeForce 6200 GPU
- 64MB/64 bit, high speed DDR memory
- Supports DVI & TV out (w/connector DVI to D-Sub)
- Supports Microsoft DirectX9.0c
- OpenGL 1.5

WinFast TV USB II Deluxe

- 3-Port USB 2.0 Hub
- Time-shifting & PIC
- Direct Burn
- De-interlacing

WinFast PVR 2000

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- Time-shifting & PIC
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benq fp231w

BenQ FP231W

specs

Price **$2799**
Supplier **BenQ**
Website**www.benq.com.au**
Specifications **23in LCD; 1920 x 1200; 16:10 aspect; 0.258mm dot pitch; 16ms; 16.7m colours; DVI, D-sub, S-Video, composite inputs.**

With BenQ continuously on the bleeding edge of fast monitors, it's only natural it jumps into the 'largest' arena. And here is their 23-inch beast, sitting at 1920 x 1200 (healthy aspect ratio of 16:10).

If you're worried about the 16ms grey-to-grey response time, we've found that our eyes could barely tell the difference, and for gaming, it's quite safe whether on FPSs, MMORPGs or RTSs. It does them all a great deal of justice, with ghosting barely visible.

With a 500:1 contrast ratio, its brightness is rather low at 250cd/m^2. Nonetheless, in a well-lit environment, this monitor shines through beautifully thanks to the highly effective anti-reflective surface.

With inputs for DVI and D-sub, BenQ went a few steps ahead and also included S-Video and composite inputs for picture in picture. Component would have made for a double treat, but this is still a nifty step forward. The advantage of having these inputs on the display itself instead of going through video-in on your video card is the latency involved with processing that video feed. But given it can only double the size of said input, it's more of a novelty.

Probably one glaring annoyance about this display was its incessant need to keep telling us what input it was using when switching resolutions. Unfortunately this can't be disabled.

If you want the biggest damn monitor out there, sporting a full 16.7 million colour palette, this is an awesomely good option, featuring a good dollop of inputs and a four-port USB hub. This monitor is a hotbed of beauty.

ND

score 9.0 OUT OF 10

shuttle sd31p

Shuttle SD31P

specs

Price **$TBA**
Supplier **SATO Technology**
Website **www.satotech.com.au**
Specifications **Intel 945G chipset; 3x 3.5in and 1x 5.25in bays; 1x and 16x PCI Express; 3x SATA; Gb Ethernet; 8x channel AC'97 audio.**

When it comes to packing power into tiny attractive shoeboxes, Shuttle is a master, though recently other manufacturers have done well playing catch-up. Just to show it's still tuned in, this is the latest incarnation of the P series of XPCs. With Intel's new 945G chipset as the mobo's backbone, this beast in disguise is capable of being an unstoppable powerhouse.

In terms of layout and features, the only thing missing that we liked in the past was the CMOS reset button on the back of the case. It's a superbly useful tool, making bung setups much less of pain by not having to dig around inside. Sorely missed.

Popping the lid, making full use of the available space, there is room for three HDDs and an optical drive, with two of the HDDs neatly hung across the top of the case (for SATA drives only, though) with their own cooling in the form of two exhaust fans at the rear. To keep up with the demanding cooling of the Pentium D, heat removal has been given a boost with the CPU socket now located at the front of the case with a cooling passage-way piping air from one side of the case to the other through grilled sections.

With PCI-E x1 and x16 slots with a power connector for the new power-hungry cards, three SATA ports with another external SATA port and two DDR2 533 DIMM slots, this minature beast is equipped to last.

If you plan on going 64-bit and grabbing a Pentium D instead of the Extreme Edition with its Hyper-Threading, you might not have considered the small barebones trip, but this is a tantalising option.

ND

score 8.5 OUT OF 10

Albatron

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Atomic
Dec.2004, Australia

PC6600GT
"Value Award"
PC Power Play
Jul.2005, Australia

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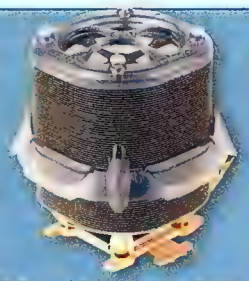
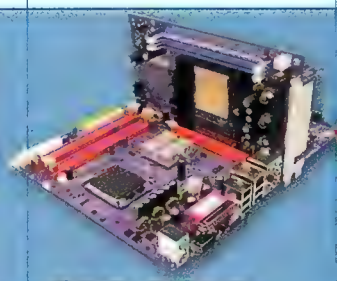
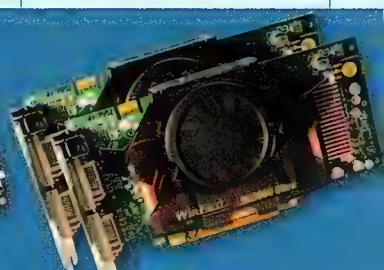
There's nothing sexier than new kit. And if you're in the market to buy, you don't want to waste your hard earned cash. Let *Atomic* advise you, with our new section for recommended kit! All of these products have been reviewed in *Atomic*. To make it easy we've created a matrix of categories for you to cross reference, so if you're buying for yourself (*Extreme*) or your mum (*Budget*), you know where to spend your cash.

	CPUs	Coolers	Motherboards	Video Cards
BUDGET	 AMD Athlon 3200+ RRP $290	 Scythe Samurai CPU Cooler RRP $49.50	 Gigabyte GA-K8V Ultra-939 RRP $139	 Sparkle GeForce 5600GT 256MB RRP $396
PERFORMANCE	 AMD Athlon FX-55 RRP $1290	 Gigabyte 3D Rocket Cooler Pro RRP $65	 ECS PF88 Extreme Hybrid RRP $260	 HIS RADEON X850 XT RRP $899
EXTREME	 Intel Pentium 4 3.73GHz Extreme Ed RRP $1590 When raw MHz and bragging rights count the P4 3.73 GHz EE is your man - or processor	 Corsair Water Cooling Kit RRP $349 Disgustingly easy to piece together, this is water cooling strutting its best and coolest	 ASUS P5ND2-SLI Deluxe RRP $390 The nForce4 made a fantastic debut on the Socket-T platform and this baby sports the lot	 Leadtek WinFast PX6800 Ultra in SLI RRP $1858 6800 Ultras are king. And two are always better than one

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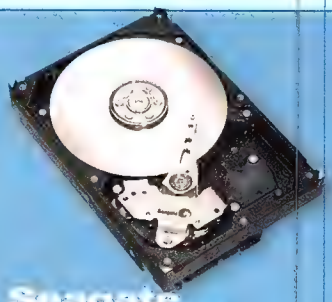
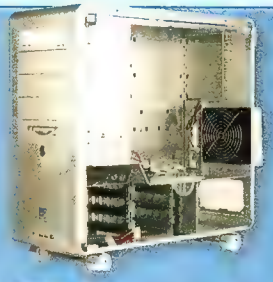
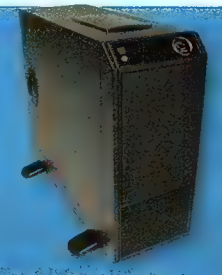
			
Seagate Barracuda 7200.8	ViewSonic VX924	Altec Lansing MX5021	Lian Li PC-V1000
RRP $539	RRP $899	RRP $349	RRP $390
			
Hitachi Deskstar 7K500	BenQ FP231W	Logitech Z-5500 Digital	Nextherm ICS 8200
RRP $886	RRP $2799	RRP $749	RRP $479
At 500GB, this SATA drive isn't cheap, but is faster and bigger than anything else on the market.	If you want big, you can't get any bigger than 23 inches of big. And widescreen, too! Only at that. Permission to smooge pants granted, soldier.	Able to play the 'round gold' sound that is DTS 96kHz/24 bit, this 5.1 beast can wreck both ears and hearing alike with equal impunity.	Packing a power watt LCD temperature readout, you can't go past a case this good. Absolutely and but want to kiss it all over. Yum!

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atomic READER SURVEY

Atomic has always strived to be the best darn magazine it can be, short of evolving into a greater being, one that transcends all other magazines. Demi-gods and whatnot.

However we think it's good to have a check-up every once in a while. You know, find out exactly what it is you like – and don't like – about this wonderful creation that we conjure each month completely out of raw passion and a printing press.

To that end, we have a magical device called a 'survey' that gives you an opportunity to tell us what it is you want from Atomic. hardware, games, consoles, science, technology, home theatre setups, mousetraps – whatever – this is your chance to let us know.

It's really that simple, and, as an added bonus, we're giving away a load of prizes – $7500 worth, in fact. All you need to do to be eligible is participate. So be in it!

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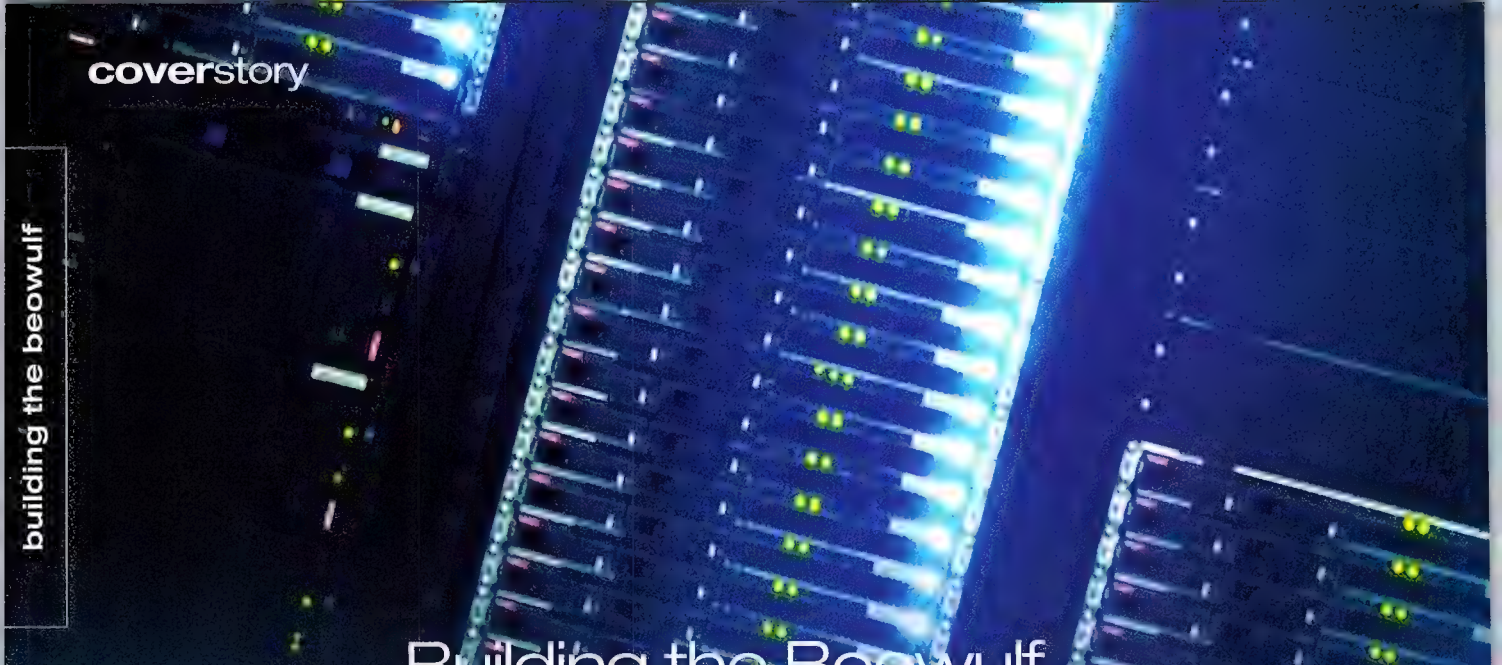


Building the Beowulf

What's more fun than building an uber beast machine desktop? Why building a supercomputer out of one, of course! Leigh Dyer shows you the easy way to build the next Skynet.

For all of the world's most complex computational tasks, from simulating weather systems to rendering Pixar movies, the traditional multi-million dollar supercomputer is long dead. Today's fastest supercomputers are really lots of individual computers hooked up together, all working in unison – otherwise known as a *cluster*.

Clusters started out as a cheap way to get supercomputer-like performance using mainstream hardware and open source operating systems. The concept was pioneered and popularised thanks to Donald Becker, whose mad scientist designs culimated in the Beowulf Project (**www.beowulf.org**) back in 1994.

As the basis of Beowulf is to use readily available hardware (otherwise known as COTS – *Commodity Off The Shelf hardware*) the first Beowulf cluster consisted of 16 486DX4 machines running Linux linked through a cheap 10Mb/s LAN. However, even then the processors were too fast for the small bandwidth of the LAN, and as any self-respecting programmer with access to the code would do, Donald re-wrote some of Linux's Ethernet drivers to 'channel-bond', or stripe, network traffic across two or more Ethernets. In fact, Donald wrote some of the original Ethernet drivers for Linux that are still there to this day.

While technically a cluster has to meet certain requirements to be called a Beowulf, the common elements mean that you can build your own at home using whatever machines you have lying around – it doesn't matter if they belong to and perform other tasks, you can use the idle cycles to create your own supercomputing cluster.

Beowulf purists may disassociatively call such clusters COWS (*Clusters of Workstations*), as the machines aren't dedicated totally just to the supercomputer, but that's really just a function of semantics, and the bottom line is that with just a little instruction anyone can build their own Beowulf.

Aside from low cost, another advantage to the cluster design is its ease of scalability. Want to upgrade your Skynet master brain to a Death Star? No problem, just add more hardware! Now, while you *can* start with a 64-node cluster of Opterons if you're rolling in money, we're instead going to show you how to setup the more common scenario of utilising the machines you currently own – desktops, laptops, and all. If it's got a CPU and can hook up to a network, you can merge it Borg style into your master supercomputing grid to manage your dastardly affairs. And then, naturally, take over the world!

you can build your own at home using whatever machines you have lying around

Begin with the basics

The de-facto standard for supercomputing tools is Unix, and more commonly Linux. So we're going to show you how to use Linux to power your supercomputing cluster. It's also free, which naturally brings down the cost of building your mastermind machine. As a result Linux nerds will find it easier to build their cluster, but if you're new to Linux don't be afraid to use this tutorial as a starting point with the OS, just take it slow and read plenty of documentation for your chosen distribution as you go.

If you're a typical *Atomician*, you've probably got PC hardware coming out the wazoo – a nice high-performance desktop system for yourself, a second desktop for your partner perhaps, a laptop or home theatre PC, and that's before you get onto resurrecting those older machines that you've retired to the back of the wardrobe. Installing extra software and getting them doing some distributed processing is definitely the best way to get started with clustering. So lets get to it!

Hardware

The basic structure of a cluster consists of slave nodes and a master node. Professional clusters make use of identical machines for all the nodes, just because they can, but it's not necessary.

Start by writing down all the machines you want to use and their specs. The master node should have a little beef to it, but storage is also important, so whatever machine has the best of both mark as the master node.

Don't worry if your list of computers seems shoddy or small, even a basic cluster can handle distributed compilation, 3D rendering, or computing trajectories for your n00bification virus payload. By example for this feature, we're going to use an assortment of typical gear lying around our labs (see *'Our Cluster'* sidebox).

Aside from the machines, the only other component you need is a network. 10/100 will do you just fine and scale to tens of machines no problem.

The more machines you use, the more bandwidth will be needed. For a smaller cluster, you could even use wireless. And as you'll see, even the simple three machine cluster we'll use can provide some tasty performance benefits.

Dual-core CPUs like the Athlon 64 X2 let you pack twice as much power into each node.

Setting it all up

The purpose of the master node is to start and stop processing jobs, and dole out tasks to the slave nodes. Usually, this is all you need to login to the cluster, so while it's handy to have a keyboard, mouse, and monitor on the master node, the slave nodes need only a power cord and network cable.

To make management easier, use DHCP. The master node can run a DHCP server, or alternatively your router can. It doesn't really matter for small clusters, but you'll definitely want it if you go large.

STEP 1

If not already, start by connecting all your machines to the router and making sure they are pingable using whatever OS is currently installed. Set static IP addresses for each machine, or use DHCP.

STEP 2

If it all looks good, it's time to install Linux. Doing this is outside the scope of this feature, but with the ease of use of modern distributions, this should be snap.

If some (or all) of your nodes are running another OS, here's your chance to Linux them up. If one of your nodes belongs to your spouse/partner/pet alien, be sure to ask permission first.

Also, you don't necessarily have to blank the system and install Linux, you can always setup a dual-boot Windows/Linux system on a machine.

Which Linux distribution you use is entirely up to you, but one of the most popular new options is the Debian-based Ubuntu distrbution (**www.ubuntu-linux.org**), thanks to its ease of use and wide selection of packages. Whatever you choose to install, the most important tool your cluster nodes will need is **OpenSSH**, the secure remote login server that makes remote maintenance a piece of cake.

After downloading, burning to CD, and installing a Linux distribution on all machines we need setup the nodes ready for supercomputing bliss. Because Ubuntu is easy, we'll show you how to configure your master and slave nodes using Ubuntu.

Configuring the nodes

The master node is essentially a full system. It's also where you'll share the filesystem to the slave nodes for projects that require it. Slave nodes, however, only need to run just enough to support the services needed. You can even disable X (the Linux GUI) to save even more resources (see the *Maximum Memory* sidebox).

Not including the standard set of services on a Linux box, the only services you need to install on both master and slave nodes are **SSH, NFS** and **Portmap**, which we'll get onto in a moment.

During the Ubuntu install, you will have been asked for a name and password for your user account. In our examples we'll use a user called ***beowulf***, but this can be anything you like. Whatever you choose, make sure you create the same account on all of your nodes.

To set up the master node, login to the desktop and open a terminal window (under Applications -> System Tools) to get access to the Linux command line. Then, follow these steps to configure remote access and file sharing, which you'll need to talk to the nodes:

STEP 1

Installing packages in Ubuntu is performed with the **apt-get** tool, which automatically fetches the required packages from the Ubuntu CD or the internet (so make sure your connection is setup and working). This command needs to run with adiministrative privileges, so we run it using the **sudo** program and fetch the packages we need:

```
sudo apt-get install openssh-server
```

STEP 2

Next we install the NFS server for remote filesystem access, and the Portmap server, which NFS needs:

```
sudo apt-get install nfs-kernel-server portmap
```

Chart Toppers

If you want more power, you can always look at buying hardware specifically for a dedicated cluster. At the top of the TOP500 list (**www.top500.org**), which ranks the world's fastest supercomputers, ultra-expensive custom hardware still rules the roost, but the majority of the machines in this list run clusters based off ordinary Xeon, Opteron, Itanium, or PowerPC CPUs working in clusters. Virginia Tech's System X, with 1100 Apple Xserve G5 nodes, comes in at number seven, while the tenth spot is taken out by NCSA's Tungsten cluster, with 2500 Dell P4 Xeon-based servers.

TOP500® SUPERCOMPUTER SITES

Our Cluster

Master node (main desktop)
AMD Athlon 64 3200+
ASUS A8V Deluxe motherboard
1x 160GB Seagate 7200.7
64MB Geforce 4 Ti4200 AGP
512MB PC3200 DDR RAM

Slave node 1 (HTPC box)
AMD Athlon XP 2200+
ASUS A7N266-VM
1x 120GB Western Digital
128MB Geforce 4 MX440 AGP
512MB PC3200 DDR RAM

Slave node 2 (old desktop)
AMD Duron 600Mhz
ASUS A7Pro motherboard
1x Maxtor 40GB 5400rpm
8MB SiS300 AGP
Intel EtherExpress PRO 10/100
384MB PC133 SDRAM

Smooth SSH

With SSH installed you no longer need to go plugging a monitor and keyboard in to your slave nodes for day-to-day operations, since you can do everything you need from an SSH session. Typing in your password each time can get tiring though, so no cluster is complete without a passwordless SSH setup. OpenSSH can use encrypted keys stored on disk as an alternative to passwords, with a tool called **ssh-agent** that caches decrypted copies of them in memory, ready to use.

On your master node, generate a keypair, with the command: **ssh-keygen -t dsa**

This creates two files in the '.ssh' folder in your home directory – *id_dsa*, containing your private key, and *id_dsa.pub*, containing your public key. The private key stays on the master, but the public key needs to be installed on each node to allow passwordless access. Copy the public key in to your shared 'pvm' folder: **cp ~/.ssh/id_dsa.pub ~/pvm/**

Now login to each node and do the following to install the key:

```
cd ~
mkdir -p .ssh
cat id_dsa.pub >> .ssh/
authorized_keys
```

Note that PVM needs an extra tweak to get it working nicely with SSH – use Nano to edit the */etc/ssh/sshd_config* file and add: **PermitUserEnvironment yes**

Then, reload the SSH server's configuration with: **sudo /etc/init.d/ssh reload**

With the key installed on your nodes, logging in from the master node will now prompt you for your key's passphrase rather than your remote password. To realise your password-free utopia, run the **ssh-add** command and enter your passphrase. This caches the key in your current session, giving you passwordless access to your remote boxes until you log out.

A typical home or office Beowulf. The layout of your cluster can really be anything you like. If you're really hardcore, you can build a dedicated rack to house your systems. Mmm... racks. Er.

STEP 3

Some of the packages you'll be using come from Ubuntu's Universe repository, which contains thousands of community-maintained packages. To configure Ubuntu to fetch packages from here, edit the */etc/apt/sources.list* file using the **nano** text editor:

```
sudo nano /etc/apt/sources.list
```

And add the following line: *deb http://au.archive.ubuntu.com/ubuntu hoary universe*

Hit Ctrl-O to save the changes, and Ctrl-X to exit. Then, tell **apt-get** to update its list of available packages with the command: **sudo apt-get update**

STEP 4

For remote file sharing, we'll be creating a folder called 'pvm' inside your home directory as PVM, one of the parrallel processing that we'll use, needs this. It's also good just for general file sharing between nodes as well. Create it with this command:

```
cd ~ && mkdir pvm
```

Note the use of the '~' character – this is a shortcut for your home directory, which is actually stored under */home/beowulf* (or whatever username you use).

STEP 5

Use nano to edit the */etc/exports* file:

```
sudo nano /etc/exports
```

Then enter the following details, replacing '192.168.1.0' with your own network:

```
/home/beowulf/pvm 192.168.1.0/24(rw,sync)
```

STEP 6

Tell the NFS server that its configuration has changed:

```
sudo /etc/init.d/nfs-kernel-server reload
```

The master node is now ready to roll. Next, physcially login to each slave node and perform steps 1 to 5 above, with the exception of installing the 'nfs-kernel-server' package, you don't need this.

Once this is done, there are a few more steps to do – just for each the slave nodes this time.

STEP 1

Edit the */etc/fstab* file (**sudo nano /etc/fstab**), and add the following line to the file, replacing 'master' with the name or IP address of your master node:

```
master:/home/beowulf/pvm  /homebeowulf/pvm
nfs  defaults  0  0
```

STEP 2

The 'fstab' file governs which local and remote filesystems Linux mounts at boot. While the share will now mount automatically on boot, you can activate it now with:

```
sudo mount /home/beowulf/pvm
```

With all the services running, and OpenSSH running on all of your nodes, you should now be able to jump on the master node (well, any node really) and get remote shell access to any other node using the **ssh** command:

```
ssh node
```

Now you're ready to install the tools of the trade.

Supercomputing Tools

When it comes to clusters performance is a factor of the number of nodes – and there's a reason for this: supercomputing is enabled by distributing tasks among the nodes, and for this there are a variety of tools with which you can parallel process.

distcc

If ever there was a poster-boy for the home Linux cluster revolution, it would have to be **distcc** (**distcc.samba.org**), an amazing tool that makes it almost trivial to distribute compilation jobs. Distributed compilation isn't a new idea, but distcc makes it simple – just take all the files that need compilation and spread them out.

getting the machine order right can net a tidy speed boost

Usually, this relies on having virtually identical nodes, with the same compiler version and the same libraries and header files installed.

distcc simplifies the job by by pre-processing the source code files on the head machine, turning each file in to a self-contained bundle of code that can be compiled without any external header files. Because of this, all distcc requires is similar compiler versions – if the major version matches (ie: each system is using a version of GCC 3.4), you should be ready to go.

In fact, since the compiler is the only requirement, nodes don't all have to run the same OS (so your nodes could run Windows and run a contained environment using Cygwin), or even the have the same kind of CPU.

distcc is packaged on Ubuntu and Debian systems, so you can install it with a single command:

```
sudo apt-get install distcc
```

After you've done this, edit your */etc/default/distcc* file and make sure the options specified look like this, replacing the '192.168.1.0/24' with the network address for your LAN:

```
STARTDISTCC="true"
ALLOWEDNETS="127.0.0.1 192.168.1.0/24"
```

To fire it up, run this command:

```
sudo /etc/init.d/distcc start
```

Now login to each of your nodes in turn and install and configure distcc in the same way. When you're ready jump on your master node and try out a compilation job – kernel compiles are a perfect example. Try these commands:

```
export DISTCC_HOSTS="localhost node2 node3"
make CC=distcc -j7
```

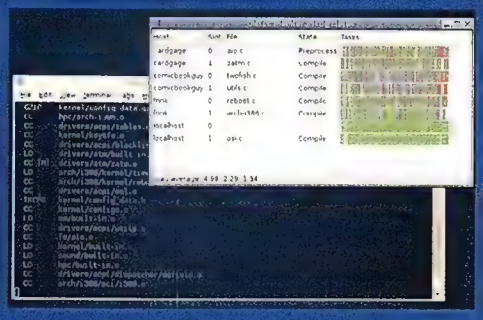
This tells 'make' to use distcc as its C compiler, and defines the list of distcc nodes to use to help out. The '-j' flag tells make how many compile jobs to run. A good number is usually twice the number of nodes plus one. For projects based on autotools (ie: those with a 'configure' script), try specifying the C compiler at configure-time:

```
CC=distcc CXX="distcc g++" ./configure
make -j7
```

If you'd like to skip the DISTCC_HOSTS export, create a file called 'hosts' in your *~/.distcc/* folder and enter one hostname per line.

Normally 'localhost' should be first, but if it's a very slow machine compared to others, or you have more than a few nodes, it's often best to put it last, or leave it off entirely. Other machines should be listed roughly in order of performance, though don't be afraid to experiment – getting the machine order right can net a tidy speed boost.

If you want to check up on your distcc cluster to see how busy each machine is, there's a neat GUI-based monitor called 'distccmon-gnome' (in the Debian/Ubuntu package of the same name) that displays the current state of each node, with a running graph.



distcc cranks rhw kernel compiles to eleven.

Ganglia

Any cluster needs a monitoring solution that can give you an overview of its health and to check up on the activity and avaliablity of its nodes.

The most popular distributed monitor is **Ganglia (ganglia.info)**, which uses a distributed architecture that perfectly matches the needs of a cluster. Each node runs a daemon that reports its status across the network, while one or more monitor nodes run data collection daemons that automatically detect the other nodes across the LAN. To display the data, there's a neat PHP-based web interface.

Grab the latest source tarball from the website, extract it, and run the build (using distcc, naturally).

IBM's Blue Gene/L is currently the most powerful computer in the world, topping the top 500 list at number 1. It sports 65536 PowerPC 440 processors, and runs Linux. It peaks at 183500 gigaflops.

Image courtesy of IBM.

you'll see a set of graphs showing cumulative stats from across all your nodes.

```
tar jxvf ganglia-3.0.1.tar.bz2
cd ganglia-3.0.1
CC=distcc CXX="distcc g++" ./configure
make -j7 && sudo make install
```

You'll need to install it on each node, but if your nodes are running similar distributions, you can build it on one node, copy the compiled source tree over to other nodes and run just the **sudo make install** step. Once each node has a copy, run the Ganglia monitor daemon on each with: **sudo gmond**

It'll warn you that no configuration file was found, but it'll happily run with default settings.

On at least one node, you'll also need to install the data gathering daemon. It relies on 'librrd', so you'll need to install packages for this first (**apt-get install librrd0-dev**). Then, build it with the '--enable-gmetad' option added to the 'configure' command:

```
CC=distcc CXX="distcc g++" ./configure
    --enable-gmetad
make -j7 && sudo make install
```

The run both 'gmond' and 'gmetad' with:

```
sudo gmond && sudo gmetad
```

With these running you should be able to check the stats of your cluster, and each node in it, with the **gstat -a** command. If you've got a web server with PHP4 support installed (something along the lines of **apt-get install apache php4** should do the job), you can install the Ganglia web interface. Simply copy the 'web' folder from the Ganglia source folder to within your web server's document root:

```
sudo cp -a web /var/www/ganglia
```

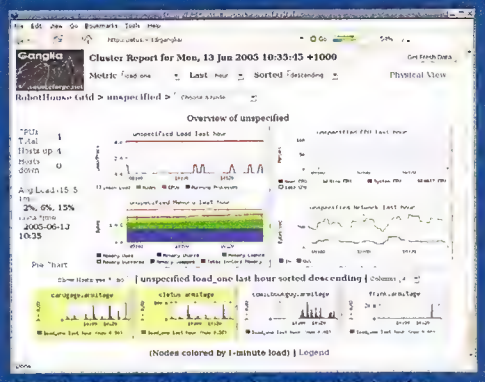
Open up the web interface by going to 'http://localhost/ganglia' in your browser. Along with the basic cluster details listed down the left, you'll see a set of graphs showing cumulative stats from across all your nodes. You can view detailed stats on a single node by selecting it from the drop-down list at the top.

Services installed from Ubuntu packages are automatically configured to start themselves on boot, but our hand-rolled Ganglia setup will have no such luck. To create a simple start-up script for Ganglia run **nano /etc/init.d/ganglia** and enter the following contents:

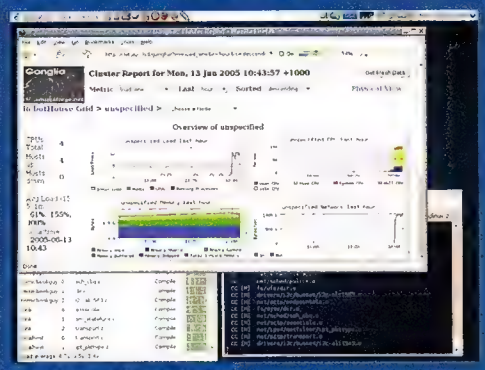
```
#!/bin/sh
/usr/sbin/gmond
```

On the master node, add a similar line to run 'gmetad' as well. Then, make the script executable, and configure it to run at boot:

```
sudo chmod +x /etc/init.d/ganglia
sudo update-rc.d ganglia default
```



Ganglia showing the cluster in a peaceful slumber...

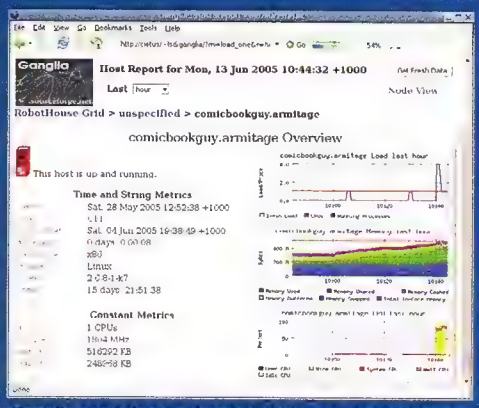


...and now a flurry of activity from a kernel compile.

Also in the Top 500, Japan's Earth Simulator cluster features 5120 NEC processors pumping out over 40,000 gigaflops.

Image copyright: Earth Simulator Center/JAMSTEC

The more nodes you have, the faster you can render



Ganglia can bring up detailed stats on individual hosts in addition to a wealth of other information.

PVM

Beyond programs like distcc, most distributed applications use pre-built clustering frameworks rather than writing their own networking code. The Parallel Virtual Machine, or **PVM**, is just such a framework. It's essentially a messaging system, with daemons on each node to handle communications, and a set of libraries that make it easy to use.

PVM requires automated SSH logins to function properly, and many PVM programs need centralised storage such as an NFS server as well, so you'll need to make sure these are up and running before installing. Installing it isn't too tricky, though. We've taken the easy way out, building just one copy of PVM since our machines are all fairly similar in software configuration, but you can build it on each machine if needed.

STEP 1

Grab the latest PVM source archive from **www.netlib.org/pvm3** and extract it inside the 'pvm' folder you shared via NFS.

```
cd ~/pvm && tar zxvf ~/pvm3.4.5.tgz
```

STEP 2

Change in to the 'pvm3' folder created, and run **make**

STEP 3

Open your *~/.bash_profile* file on each node using nano, and add the following lines, so that your shell can find the PVM commands and so PVM can find the files it needs to run:

```
export PVM_ROOT=$HOME/pvm/pvm3
export PATH=$PATH:$PVM_ROOT/lib:$PVM_
ROOT/bin/LINUX
```

STEP 4

Edit or create the *~/.ssh/environment* file on each node and add the following line:

```
PVM_ROOT=/home/beowulf/pvm/pvm3
```

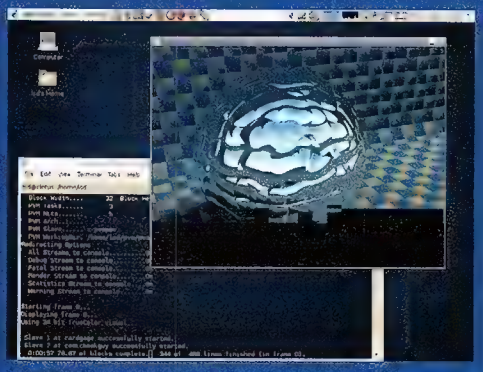
STEP 5

Edit the */etc/hosts* file on each node, and make sure that the node's hostname isn't aliased to '127.0.0.1' – PVM won't work properly if it is. If your nodes will always be hooked in to your network, it's safe to remove the alias for its hostname altogether.

Log out of your master node and log back in to refresh your environment, and then run the **pvm** command. This PVM shell lets you interact with PVM's view of your cluster. Use the **conf** command to list the nodes in your cluster – only the master node should appear at this point. To add a node, use the **add** command: **add *hostname***

If all goes well, you should be able to run **conf** again and see the newly added node in the list. If anything goes wrong, PVM should give you a traceback to help track down the problem. If you've finished working with the PVM shell, use the **quit** command, which exits the shell but leaves the PVM daemons running. To shut these down, use the **halt** command.

Instead of adding nodes one-by-one each time you start PVM, you can add them all at startup by placing the node names in a text file, one per line, and giving this file as an argument to PVM when firing up the cluster.



PVMPOV lets your cluster handle complex 3D rendering.

Distributed rendering

POV-Ray is the de facto standard in open source 3D rendering, with a long history and a number of advanced features. It's a command-line tool that takes files written in a special scene definition language, which artists tend to create using GUI tools, but for scientific computing it's more common to generate POV-Ray code using your own programs, rendering shiny 3D representations of complex data sets.

An unofficial patch called PVMPOV adds PVM support to POV-Ray, letting you split complex image renders into chunks for execution across the nodes of a cluster. The more nodes you have, the faster you can render. This is common practice for film studios.

Unfortunately, the latest stable version of the patch is for POV-Ray 3.1g, which has been superceeded by the 3.6 release, but PVMPOV is still great as a start for experimenting with parrallel processing, and just plain cool to show off to family/friends/the opposite sex.

Maximum Memory

If you're running headless slave nodes, you might like to disable X, the Linux GUI system, to free up the RAM it would otherwise waste. Run these commands to shut X down, and make sure it doesn't restart at boot:

```
sudo /etc/init.d/gdm stop
cd /etc/rc2.d
sudo rm S99gdm
```

Later on, you might decide to re-enable starting the GUI at boot – this command should do the job:

```
sudo update-rc.d gdm defaults
```

Or, you can start it for just the current session:

```
sudo /etc/init.d/gdm start
```

STEP 1

Grab the POV-Ray 3.1g source files (**povuni_s.tgz** and **povuni_d.tgz**) from **ftp.povray.org/pub/povray/Old-Versions/Official-3.1g/Unix**. Then, grab the PVMPOV 3.1g2 patch from **pvmpov.sourceforge.net**.

STEP 2

Extract the PVMPOV patch tarball inside your shared 'pvm' folder, change in to the directory it creates, and then extract the POV-Ray source code:

```
cd ~/pvm
tar zxvf ../pvmpov-3.1g2.tgz
cd pvmpov3_1g_2
tar zxvf ~/povuni_s.tgz
tar zxvf ~/povuni_d.tgz
```

STEP 3

Run the **./inst-pvm** script (note the preceeding '.' on that command) to patch your POV-Ray source code.

STEP 4

Type **cd povray31/source/pvm** followed by **nano Makefile.aimk**. Find the lines that begin with 'LIBPNG' and make sure they look like the following:

```
LIBPNGINC =
LIBPNGLIB = -lpng
```

STEP 5

Run **aimk newunix** to start the build process, or **aimk newxwin** to create a version with X display support (ie with a GUI).

STEP 6

Copy the *pvmpov* file from the 'LINUX' directory to your '$PVM_ROOT/bin/LINUX' directory:

```
cp LINUX/pvmpov $PVM_ROOT/bin/LINUX
```

STEP 7

Copy the 'include' folder from the 'povray31' folder to ~/pvm/pov-include:

```
cp povray31/include ~/pvm/pov-include
```

STEP 8

Create a file called *.povrayrc* in your home directory (type **cd ~ && nano .povrayrc**) on each node with the following contents:

```
Library_Path=/home/beowulf/pvm/pov-include
Quality=9
Antialias=true
Sampling_Method=2
Display_Gamma=2.2
```

STEP 9

Now, the scene should be set for your first parallel POV-Ray run:

```
cd povray31/scenes/advanced
pvmpov +v -w640 -h480 +iskyvase.pov
```

PVMPOV should automatically spawn one process on each node of your PVM cluster, rendering different sections of the image on each and combining the results.

Transparent clustering with OpenMosix

So far we've looked at explicit distributed systems, where the developers have created versions of applications specifically designed for distributed operation. A change is coming though, in the form of OpenMosix: a set of Linux kernel patches and userspace tools that turn the nodes of a cluster in to a single virtual Linux system. When you run an application on a node, OpenMosix can automatically distribute the application to another node.

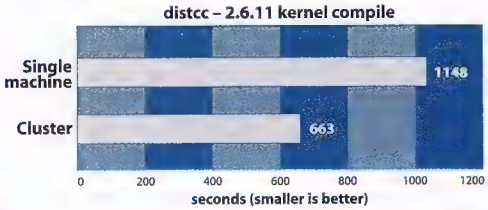
For instance, say you're encoding a bunch of MP3 files. You can start a LAME encoder process for each

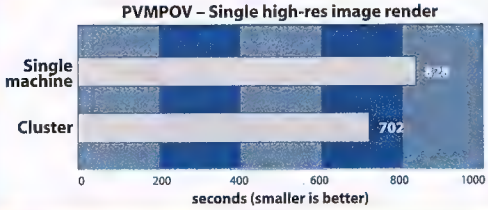
developers have created versions of applications specifically designed for distributed operation.

Benchmarks

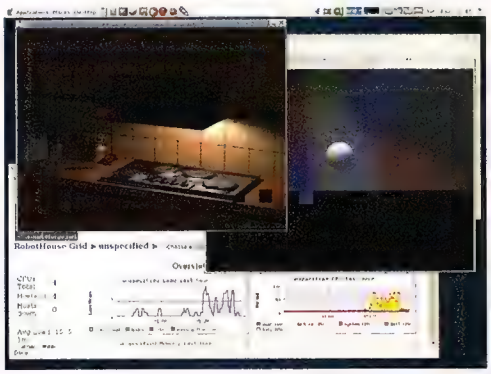
Naturally, there's no point playing with these wonderful tools unless you can measure a performance impact.

So, using just the three basic 'household' PCs in our setup, what can we achieve with these supercomputing tools? Using our basic three machine cluster, we benchmarked compiling with distcc and rendering with PVMPOV. See the results below.





Overall, not too bad! distcc saw a 73% improvement while PVMPOV increased by 18%. Ultimately, the performance of the cluster depends not only on the type and number of machines, but also the tools used and, of course, the type of jobs you run. Calculating your tax won't see much of an improvement, but compiling your latest Halflife 2 map or greatest game of all time will. Play and find out!



file all at once on a single node, and watch as they're migrated to seperate nodes, making optimal use of your cluster's resources. The migration is completely transparent, so you can still interact with the tasks and even see them running using tools like **top** – they'll just run a lot quicker than they would if they were all on the same node.

Some types of applications, such as those that use multiple threads, can't be migrated, but most simple programs, as well as programs that use multiple processes, rather than threads, can be migrated.

Since setting up OpenMosix requires a bit of trickery, the best way to experiment with it is to grab a live CD. One such CD is the *Bootable Cluster CD*, which you can download from **bccd.cs.uni.edu**. Grab and burn the latest version, and follow these steps on each node to get your cluster running.

STEP 1

Boot from the CD, and hit Enter at the boot screen. The system should start booting, displaying various boot messages. When prompted, enter a password to use for the 'bccd' user. The network setup script should appear shortly.

STEP 2

Once it has found your network card, select the appropriate driver from the list, or use the 'auto' option if you're not sure. Enter your network settings, or (preferably) use DHCP to autodetect them. When the login prompt appears, log in as 'root' with the password 'letmein' (heh).

STEP 3

Run **omdiscd**. You should see a message confirming that your machine is now part of an OpenMosix cluster.

```
openMosix #399 is at IP address 192.168.1.43
```

Any previously added nodes should be listed as well, as they're automatically detected over the network.

STEP 4

On one node, log out and log back in as 'bccd', with the password you specified earlier. Say No when prompted about the BCCD heartbeat process (this is used by other tools, but not by OpenMosix). Then, run the **startx** command to start the GUI.

STEP 5

Once the GUI comes up, you can start playing with your cluster. Right-click on the desktop and select 'openmosixview' from the Clustering menu. This tool lists each node in the cluster along with stats on its current load and memory usage.

Everything should look quiet at this point, so let's get in and do some testing. Open a terminal (under Terminals in the desktop right-click menu), and build the Life demo program:

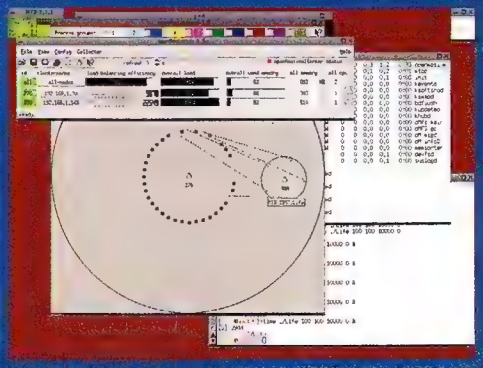
```
cd Life && make
```

Run the Life program in the background so that you immediately get your shell back with:

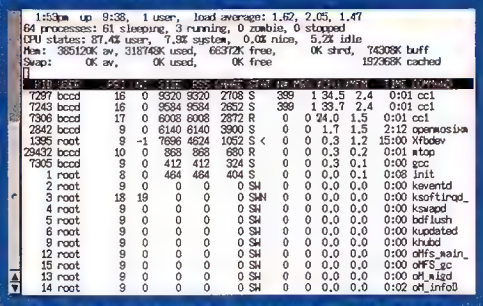
```
./Life 100 100 10000 0 &
```

Use the up cursor key and Enter to run a few more copies of Life. Watch the load on the cluster in OpenMosixView – the node you're sitting at should spike up at first, but as the processes are migrated to other nodes, their loads will increase as well.

Because OpenMosix is transparent, if you run **top** from a terminal you'll see your processes running just as you'd expect to. The OpenMosix-aware **mtop** reveals all, listing the node details alongside each process. For an more impressive view, open 'openmosixmigmon' from the Clustering menu, and re-run the Life test.



OpenMosix transparently migrates CPU-intensive tasks to other nodes of your cluster.



```
 1:59pm  up  9:38,  1 user,  load average: 1.62, 2.05, 1.47
64 processes: 61 sleeping, 3 running, 0 zombie, 0 stopped
CPU states: 87.4% user,  7.9% system,  0.0% nice,  5.2% idle
Mem:  385120K av, 318748K used,  66372K free,       0K shrd,   74308K buff
Swap:      0K av,      0K used,      0K free                  197368K cached

  PID USER     PRI  NI  SIZE  RSS SHARE STAT %CPU %MEM   TIME COMMAND
 7297 bccd      16   0  9320 9320  2708 S   399  1 34.5  2.4   0:01 cc1
 7243 bccd      16   0  9584 9584  2652 S   399  1 33.7  2.4   0:01 cc1
 7306 bccd      17   0  6008 6008  2872 R     0  0 24.0  1.5   0:01 cc1
 2842 bccd       9   0  6140 6140  3900 S     0  0  1.7  1.5   2:12 openmosixa
 1395 root       9  -1  7696 4624  1052 S <   0  0  0.3  1.2  15:00 XFree86
29432 bccd      10   0   868  868   680 R     0  0  0.3  0.2   0:01 mtop
 7305 bccd       9   0   412  412   324 S     0  0  0.3  0.1   0:00 gcc
    1 root       8   0   464  464   404 S     0  0  0.0  0.1   0:08 init
    2 root       9   0     0    0     0 SW    0  0  0.0  0.0   0:00 keventd
    3 root      18  19     0    0     0 SWN   0  0  0.0  0.0   0:00 ksoftirqd_
    4 root       9   0     0    0     0 SW    0  0  0.0  0.0   0:00 kswapd
    5 root       9   0     0    0     0 SW    0  0  0.0  0.0   0:00 bdflush
    6 root       9   0     0    0     0 SW    0  0  0.0  0.0   0:00 kupdated
    9 root       9   0     0    0     0 SW    0  0  0.0  0.0   0:00 khubd
   12 root       9   0     0    0     0 SW    0  0  0.0  0.0   0:00 oMFS_main_
   15 root       9   0     0    0     0 SW    0  0  0.0  0.0   0:00 oMFS_gc
   13 root       9   0     0    0     0 SW    0  0  0.0  0.0   0:00 oM_migd
   14 root       9   0     0    0     0 SW    0  0  0.0  0.0   0:02 oM_info0
```

The 'mtop' tool shows a process list revealing which node each task is running on.

This tool shows a graphical representation of your cluster, with your current node in the middle and other nodes in a circle around it. The small black dots around the centre node are individual processes. As you fire up more copies of Life, you'll see them appear as black dots around the centre node briefly before being migrated to other nodes, appearing as green dots around the nodes with a line leading back to the centre.

Conclusion

From here you can start experimenting with your preferred tools for running programs across your cluster. You can even run Seti@Home across an OpenMosix cluster.

Whether you've got a few spare PCs that you'd like to harness for good (or evil), or just find the idea of owning your own mini supercomputer damn cool, clustering can give you amazing performance for little or no cost. With so much raw computing power at our fingertips, just waiting to be put to use, *Atomic* world domination must surely be at hand. Go forth, and conquer!

A node by any other name

Tired of refferring to your nodes by IP? No problem, give them a name!

Simply **nano /etc/hosts** and add a line for each node with its IP and desired name. Add all machines to this file, including the master. Then, simply copy it to all machines in the cluster. You can then refer to any machine by name instead of IP when issuing a command, ergo: **ssh gigantor**

watch as they're migrated to seperate nodes, making optimal use of your cluster's resources

Tenor

See The World in A Different Way

New Home Theatre Style PC Case from Thermaltake

Front 5.25" drive bay access

Dual USB 2.0,
IEEE 1394 Firewire,
Audio & Speaker ports

Non-slip foot stands

Rear Fan (Exhaust)

Front Fan (intake)

Model Tenor	VB2000SNS	VB2000BNS
Colour	Silver	Black
Net Weight	8.5 kg	
Dimension	170 x 430 x 460 mm (H*W*D)	
Cooling System	● Front (intake): 80 x 80 x 25 mm fan, 2000rpm, 19dBA ● Rear (Exhaust): Dual 60 x 60 x 25 mm silent fan, 2500rpm, 19dBA	
Front Accessible Internal	3 x 5.25", 2 x 3.5" 3 x 3.5"	
Material	Chassis: 1.0 mm SECC. Front bezel: Aluminum made	
Expansion Slots	7	
Motherboards	ATX, Micro ATX	

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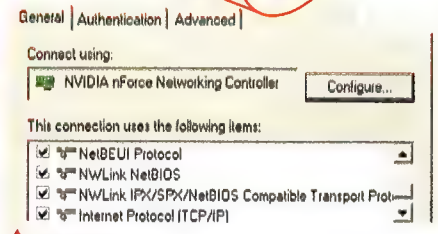
technique

Hands-on tutorials, tips, and tweaking for the technically inclined.

this month



Windows
Aw yeah, VPNs are where it's at when it comes to, er, doing VPNish things. Learn how now!

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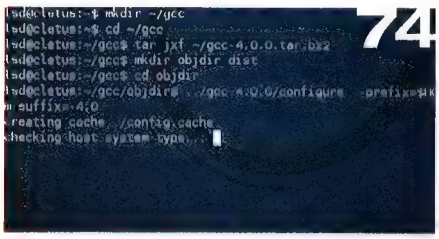
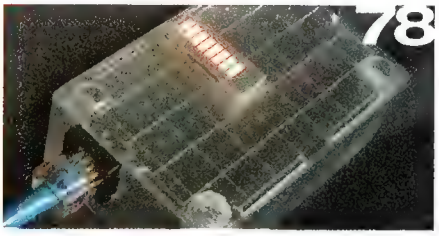


Linux
Compiling is fun, for everyone. This month, learn to play with the all-new GCC 4.0.

78



Hardware
LAN cables are your lifeblood, make sure they're all working with your very own tester.

tinytweaks

Search me happy

Are you up to scratch with the Windows search syntax? No? The read on!

Entering **"Optimus Prime"** will find all instances of that exact string. Removing the quotes will display all files containing both 'Optimus' and 'Prime', regardless of the order in which they were entered.

Multiple search terms can be split using semicolons, so the search phrase **Optimus;Prime** will find all files containing 'Optimus' or 'Prime'. You can search multiple drives or computers using the same method (make sure to terminate drive letters with a backslash).

Wildcard character masks can also be used, where '*****' represents any number of unknown characters, and '**?**' represents a single variable character – yep, just like at the command line, bless it! Now go found that Transformer!

Let sleeping drives lie

We all know about the wonders of the **hdparm** command for speeding up your hard drives, enabling DMA and 32-bit transfers to maximise throughput and minimise CPU usage.

The program has a few more tricks up its sleeve though, letting you configure power management on your drives to minimise system noise (and, of course, power usage). Use the '-S' option to set an automatic spindown time for your drive:

sudo hdparm -S 180 /dev/hda

For values between 1 and 240 the timeout is this value times 5 seconds, so '180' equates to a 15-minute timeout.

Some drives also have Automatic 'Accoustic Management' features that you can adjust with the '-M' option – try different values between 0 and 254 and check the results.

Avoiding static

There's a reason you see the people in component factories wearing wrist straps designed to ground the body – static electricity is a killer for integrated circuits.

It goes without saying that you need to treat your gear like the precious gold that it is, and never touch ICs or connectors on cards directly. But this isn't always avoidable, especially when fiddling around in a built case.

The real hardcore modders will have anti-static straps, but what if you don't have one in a pinch? No problem!

Before you start, and every now and then while working, simply touch any metal edge on your case while the power cable is still plugged in at the wall and the computer is *switched off*. The PSU is grounded through the cable, the case through the PSU, and in turn you.

My first VPN

Join Craig Simms as he networks his privates, virtually.

VPNs are where it's at. In short, they are a secure internal network established over the internet. In long, that means transferring files, playing games and doing things that are usually reserved for LANs (excluding gorging one's self on pizza, caffeinated beverages, and attacking innocent sleeping victims with permanent markers) without having to drag boxes anywhere. If you're lucky enough to be an ADSL subscriber whose ISP peers with PIPE, VIX, WAIX or allows free data between users of the same state, then a quota-free network is only a few steps away.

Open sesame!

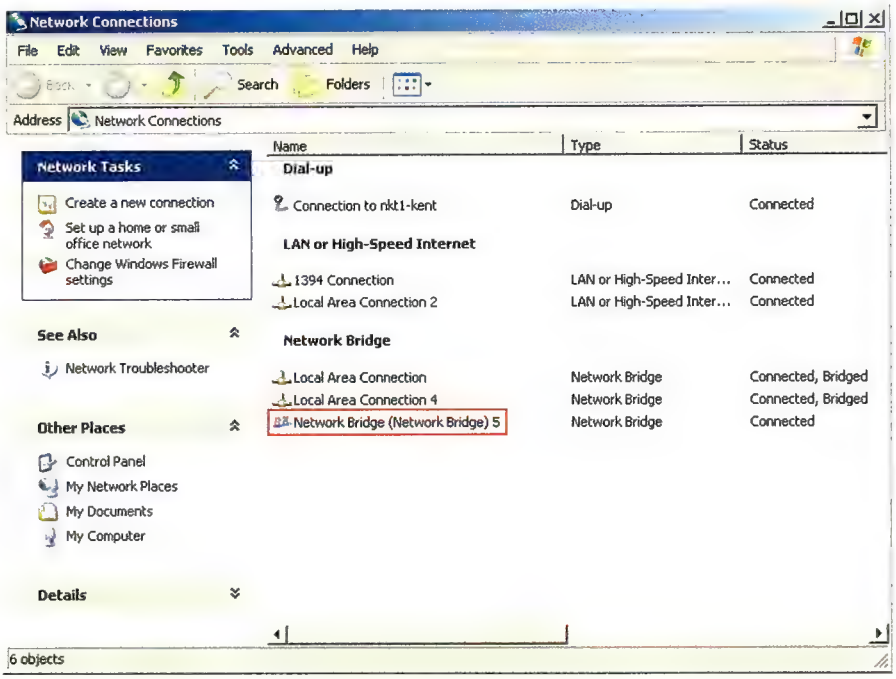
Rather than limit ourselves to the Windows platform with something like Hamachi, or a client-based program like WASTE, we're going to go for the transparent multi-platform OpenVPN, or rather, the GUI variant found at **openvpn.se**.

Start by downloading and installing the program – the default options should be fine. Along with the program files, an unsigned virtual Ethernet adaptor and driver is installed, so be prepared to click 'Continue Anyway' a few times. If the installation appears to stall, it's likely that your firewall is querying whether to allow the new adaptor access in the background. You'll have to clear it for installation to proceed.

The next step is the configuration of the server. Our first step is to set up our new VPN adaptor (TAP-32) in bridged mode – this allows us to bind it to another Ethernet adaptor of our choice, so they share common network settings such as IPs. By attaching our virtual adaptor to a real one, we're also allowing packet broadcasting (so things like Network Neighbourhood browsing and non-TCP/IP games will work) and enabling those on the local network to access those on our remote network and vice versa.

You'll need a second network card to pull this off if you've already got an Ethernet modem hooked up – otherwise you'll need to set up in routed mode, which for general use is fine, but denies us all the benefits of bridged mode.

To set up the network bridge, right click on the My Network Places icon on the desktop, choose Properties to open the Network Connections dialog, then select both the VPN connection and LAN connection you wish to bind to, right click, and then choose Bridge Network Connection. Note that you should not bridge a connection that has Internet Connection Sharing enabled (as ICS is a kind of bridge), or one that is connected to a modem directly. If all goes right you should have a new icon called 'Network Bridge', and your net connection should still be up and running.



▲ **No broadcast packets? Build a bridge and get over it!**

Configure, me hearties!

Browse to where you installed OpenVPN and copy 'server.opvn' from the sample-config into the config folder. Open it with a text editor, and find the lines:

```
;dev tap
dev tun
```

And move the semi-colon from the top line to the second. Here we are uncommenting the tap argument, which effectively enables it, while disabling the 'tun' argument. What we've done is told our server that we're running a bridged connection, as opposed to a routed one. Find the line:

```
server 10.8.0.0 255.255.255.0
```

and comment it by entering a semi-colon at the front, as this is used only for routed connections. Now uncomment the line:

```
;server-bridge 10.8.0.4 255.255.255.0
10.8.0.50 10.8.0.100
```

In its current state, this line defines the server IP as 10.8.0.4, on a subnet mask of 255.255.255.0, and allocates connecting client IPs in the range of 10.8.0.50-100. Finally, if you wish multiple clients to see each other and not just the server, uncomment the **client-to-client** line. Save the file and exit your text editor.

Return to the Network Connections dialog, right click on Network Bridge, choose Properties and select Internet Protocol (TCP/IP) from the bottom box. Click the Properties button and then enter the IP address 10.8.0.4, and the subnet mask 255.255.255.0. Click OK and then OK again to set the adaptor. Note that if you wish to use another IP you must ensure both the Network Bridge properties and the server.opvn file are updated accordingly. It is also preferable to use an uncommon IP, so conflicts are unlikely occur. Many home networks use the block 192.168.0.xxx for example – it's best to avoid this so home networks and your VPN don't conflict. Valid internal IPs exist in the following ranges: 10.0.0.0 – 10.255.255.255, 172.16.0.0 – 172.31.255.255 and 192.168.0.0 – 192.168.255.255.

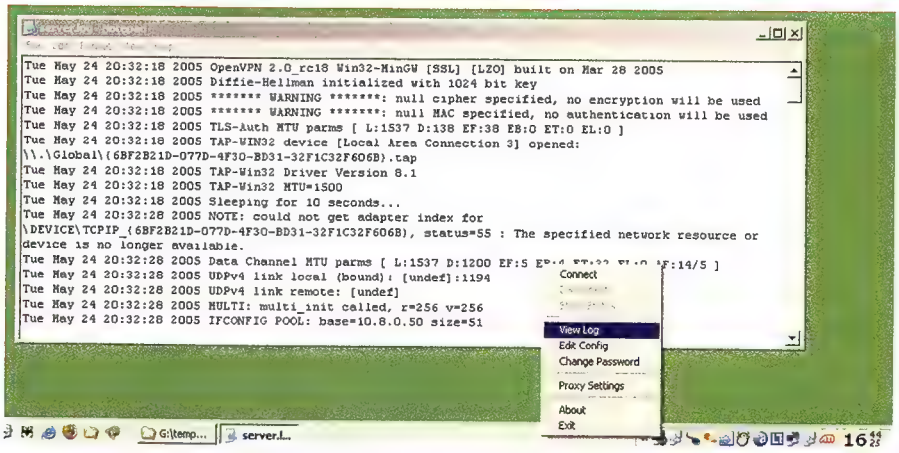
More configgin...

Much like the SSH server we set up in *Issue 50*, OpenVNC makes use of public and private keys, with the addition of something known as the Certificate Authority. Anyone trying to connect to the server must have their key signed by the Certificate Authority – adding another layer of security.

Open a command prompt and browse to the easy-rsa folder (under your installed OpenVPN folder) and type:

```
init-config
```

This will set up the configuration files. From the same folder, open up 'var.bat' in a text editor and adjust the KEY_COUNTRY, KEY_PROVINCE, KEY_CITY, KEY_ORG, and KEY_EMAIL parameters. These values represent your two letter country code (AU), state, city, organisation and email respectively.



▲ **Dumping a log, per se, has never been so easy or informative.**

They are also used to generate keys, and setting them in the batch file sets the entries as default so you don't have to enter the same details again and again. Save the file, jump back into the command prompt and type:

```
vars
clean-all
build-ca
```

This sets the variables as above, removes any existing keys and begins the build of the Certificate Authority file. You'll be quizzed on a number of parameters – simply hit enter to use the defaults you previously set up in 'vars.bat' (shown between brackets). For the Common Name, enter **server** and hit enter.

Next we want to generate the private and public key for the server:

```
build-key-server server
```

For the Common Name query enter **server**, enter a challenge password, then enter **y** to sign the certificate, and **y** again to commit.

Finally, we need to generate Diffie-Hellman parameters. This is essentially the protocol that allows us to switch keys securely.

```
build-dh
```

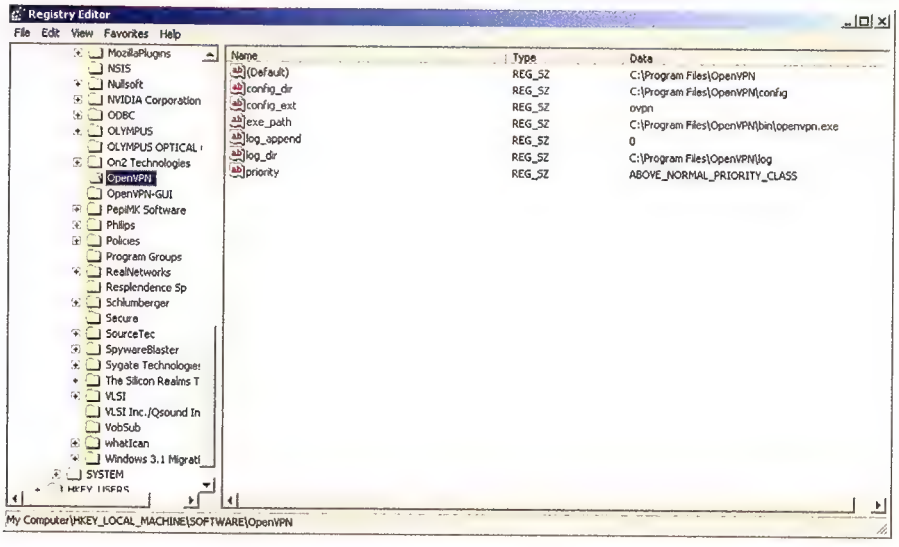
This will take a little while. Once done, the server setup is complete!

Dealing with clients

Now we need to build keys to distribute to the clients that will be connecting to our VPN. Type:

```
build-key <client>
```

Replacing '<client>' with the name of the person who the key is going to be for. Be sure to



▲ **Once again we go hunting in the registry, this time to change the priority that OpenVPN operates at. Make sure to change the OpenVPN key, and not the OpenVPN-GUI one.**

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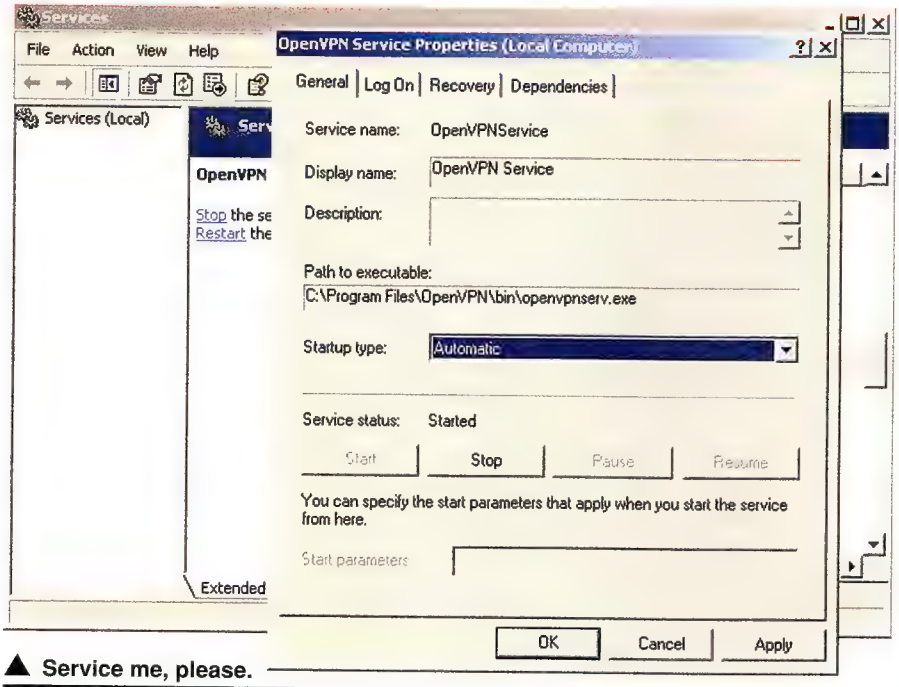


▲ **Service me, please.**

enter a unique common name (you can use the same name as you used above), password and sign the certificate as well. Every connecting client will need their own keys.

So now we've generated a whole bunch of files in our easy-rsa\keys folder. Your clients will need a copy of the 'ca.crt' file, as well as their own .crt and .key files that you generated for them. The rest (including ca.crt) can stay on the server.

Let's setup OpenVPN on the client machines. Install as before, except instead of 'server.opvn', copy 'client.opvn' from the sample-config into the config folder. Open the file in a text editor and set the connection to **dev tap**, then find the line **remote my-server-1 1194**, and replace my-server-1 with the server's online IP. If the server doesn't have a static IP, try signing up with a service like **www.dyndns.org** and using the domain it allocates instead. Next, you'll need to find the following lines:

```
ca ca.crt
cert client.crt
key client.key
```

Replace 'client.crt' and 'client.key' with the key names for the client you generated earlier, making sure to provide the full path with double-back slashes instead of just the file name. So for example, **cert client.crt** would become **cert "C:\\Program Files\\OpenVPN\\easy-rsa\\keys\\client.crt"** if you installed OpenVPN to its default directory. Save the file. The basic setup is now done.

Return to the server machine, and go to Start –> Settings –> Control Panel –> Administrative Tools –> Services. Scroll down until you find 'OpenVPN Service'. Right click on it, choose Properties, set the start-up type to Automatic and click the Start button, then OK. The OpenVPN server should now be running, and be started every time Windows does. You can right click on the OpenVPN GUI icon in the system tray and choose 'View Log' to see how the start-up progresses, and to troubleshoot any problems along the way.

Back on the client machine, right click on the OpenVPN GUI icon, and choose 'Connect'. Luck and firewalls permitting, everything should go well and the client should be assigned an IP. Try pinging between the server and the client's VPN IPs to make sure everything is OK. If you have other machines on the local server-side network that share the VPN IP range, try getting your internet clients to connect to them, it should work easily. Sweet success!

Oh noes!

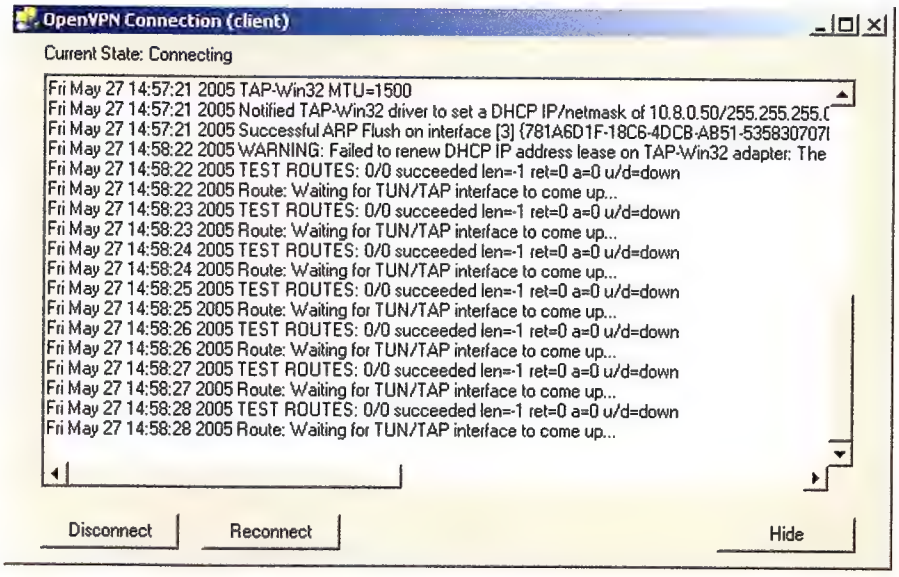
OK, let's face it, for home use there's only one thing a VPN is good for – games! In particular, old games that either don't support TCP/IP or internet play.

The first step to increase our compatibility with old games is to install the IPX/SPX protocol. Right click on My Network Places, choose Properties, right click on the Network Bridge and choose Properties again. Click the Install button, select Protocol and hit the Add button. Choose NWLink IPX/SPX/NetBIOS Compatible Transport Protocol and hit OK.

Select the protocol you just added and hit the Properties button. Set the Internal Network Number to a unique integer on every machine, the Frame Type to Ethernet 802.3 and the Network Number to the same as the Internal Network Number. Click OK.

If further connection problems are run into, we made need to install NetBEUI. Add another protocol, except this time hit the Have Disk button. Put in your Windows CD, and browse to VALUEADD\MSFT\NET\NETBEUI (for Windows XP Pro), select NETNBF.INF and hit Open and then OK. You may need to restart your PC after this.

You may also find on some installations that when playing a game there is extreme lag – in the order of around a minute.



▲ **Your clients may need to set their IP manually if they're seeing this.**

▲ **'No, Starcraft is not Warcraft in space!' The old classic worked flawlessly online over IPX/SPX on our bridged VPN.**

This is usually caused by OpenVPN not getting the priority it requires to process the connection. This is an easy fix – open Regedit, and browse to the key HKEY_LOCAL_MACHINE\SOFTWARE\OpenVPN. Double click on the Priority string and change the Value Data to ABOVE_NORMAL_PRIORITY_CLASS and restart the service. If you still get no joy in your gaming pings, try setting the game to a lower priority through the task manager (Ctrl+Shift+Esc).

What? You still want better pings? OK, try adding:

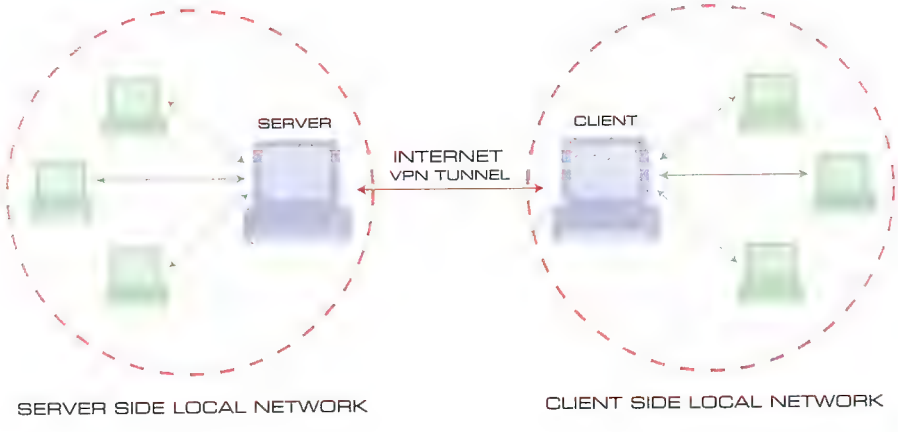
fragment 1200

mssfix 200

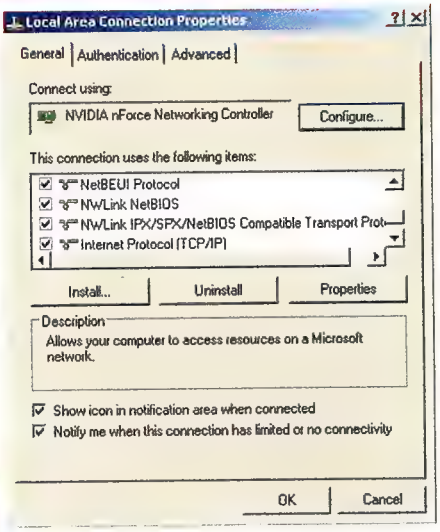
to the server config file, and just **fragment 1200** to the client files.

If you don't care for the added security encryption offers, set **cipher none** and **auth none** in both client and server files for a little boost in pings.

Sometimes the dynamically-allocated IP sent to clients won't take, thanks to the common Windows XP SP2/third-party firewall problem – they're still connected to the VPN, it's just that the TAP adaptor has not updated successfully. Try and either update, create a specific rule in, or disable your firewall.



▲ **VPN enables us to add clients we choose to our local network over the internet. Anyone else who is not authenticated on the server cannot connect, keeping nasties at bay, and friends close.**



▲ **You'll have a few more protocols installed by the time you've finished setting up a VPN.**

If there's still no joy, check that the DHCP Client service is running – if you're still not receiving an IP, then we've hit the above mentioned issue.

The workaround is to either get the clients to set their IP manually through the Network Properties dialog, or to try their luck with a beta TAP driver (**openvpn.net/beta**) to attempt to rectify the problem.

There's a whole bunch of extra configuration options you can try, that either add security, lower latency, enforce password entry, or tweak dozens of network settings – most of these are documented at **openvpn.net** – however for a bunch of extra commands, try typing **openvpn --help | more** at the command prompt. Most of these options can be used in the config files, minus the preceding double-dashes.

There we have it – a functional VPN. For extra flexibility, you could try setting up the server on a Linux gateway rather than your main machine – the install process isn't too dissimilar, and the config files should stay mostly the same. This should also circumvent the need to muck around with the priorities as mentioned earlier, for a smoother gaming experience. You could even set up an exclusive VPN to deal with regular offsite backups.

So hook up with some friends and engage in some hot and heavy VPN StarCraft glory!

Thanks lads!

Special thanks to Marcel Ratnam and Ross Gibbs for helping with the testing and implementation of the VPN.

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Compiler for hire

Leigh Dyer takes a look at the latest version of the GCC compiler. Time to make machine code baby!

While a lot of people would probably point to projects like Linux or Apache when asked to name the most important open source projects, one critically-important project that rarely rates a mention is GCC. Compilers aren't glamourous projects, but by giving developers a powerful and portable set of compilers, GCC has been fundamental to the success of Linux.

Particularly on Linux, there's very little code that GCC doesn't have a hand in, whether it be C code compiled directly or interpreted code like Python running through a GCC-built interpreter, so improvements in GCC have the potential to boost the performance of the open source world as a whole. With this in mind, we decided to have a look at GCC's latest major milestone – GCC 4.0.

The new GCC

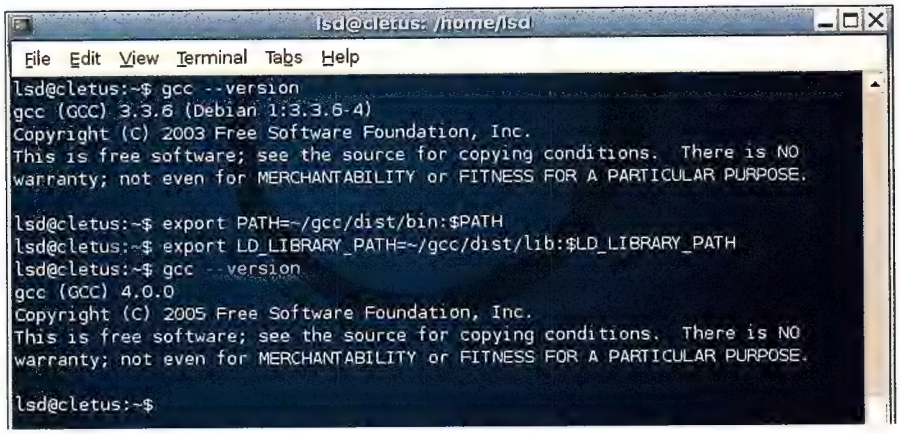
GCC developers have been busily adding new features and tweaking existing ones throughout the life of GCC 3.x (particularly the binary format for C++ programs, much to the annoyance of distribution developers), but with 4.0 they've taken the opportunity to redesign GCC's fundamental operation. The result is probably the biggest change in GCC 4.0 – tree SSA.

GCC consists of front-ends, which take code for a specific language and convert it in to GCC's own intermediate language, and back-ends, which convert the intermediate code in to machine code for a specific platform. Before code generation, an optimiser goes through the intermediate code.

Tree SSA breaks up the front-end, converting the input code in to a standardised internal tree format before conversion to intermediate code. These trees allow the compiler to perform a range of new and improved optimisations, paving the way for improved performance.

A great example of a new optimisation made possible by Tree SSA is 'autovectorisation', which GCC 4.0 has a minimal implementation of. Modern CPUs implement vector instruction sets like SSE on Intel/AMD CPUs and Altivec on PowerPC, but C has no syntax for dealing with vector operations explicitly, so programmers are usually forced to write custom assembler code to make use of them.

Autovectorisation gives GCC the ability to spot loops that can be vectorised, rewriting them to use vector instructions. It's still early days for autovectorisation in GCC, but if you want to play with it, you can enable it with **-ftree-vectorize**. Make sure you enable support for your CPU's vector instruction set as well (**-msse**, **-msse2**, or **-maltivec**).



▲ **Installing a new GCC into a separate folder is surprisingly easy.**

Installing GCC 4.0

Upgrading your installed GCC is no small matter, so by far the easiest way to manage it is to wait until your favourite distribution makes the jump. Ubuntu's latest release has pre-release GCC 4.0 packages, and the upcoming Fedora Core 4 release is based completely on it.

If you can't wait, then the best thing to do is to grab the GCC 4.0 source code and build it in to a separate folder. Once that's done, you can tweak your shell variables to execute your new GCC install.

1 Grab the latest GCC 4.0 source code tarball from **gcc.gnu.org**.

2 Create a folder to put everything in – perhaps a 'gcc' folder in your home directory. Extract the GCC tarball into it:

```
mkdir ~/gcc
cd ~/gcc
tar jxf ~/gcc-4.0.0.tar.bz2
```

3 In the same folder, create a new folder called 'objdir', and another called 'dist'. Now, go to the 'objdir' folder:

```
mkdir objdir dist
cd objdir
```

4 Run the configure script:

```
../gcc-4.0.0/configure --prefix=$HOME/
gcc/dist
```

Other options you might want to add include:

--with-arch=xxx
Specify the default architecture to build code for

--program-suffix=-4.0
Add a '-4.0' to the end of all of GCC's executable names

]--disable-multilib[/code]:
Disable 32-bit support on 64-bit AMD64 systems

5 Start the build process:

```
make bootstrap
```

You can run off for a coffee or 17 now – the bootstrap will take a good hour at least on a reasonably quick box. The bootstrap uses your current C compiler to build a minimal C compiler called 'xgcc', which it then uses to build GCC's full C compiler. The final C compiler is then built using this compiler, and used to build the other compilers and their runtime libraries.

6 If everything goes well with the build, install it into your 'dist' folder:

```
make install
```

7 Set up your shell variables to find your new compiler:

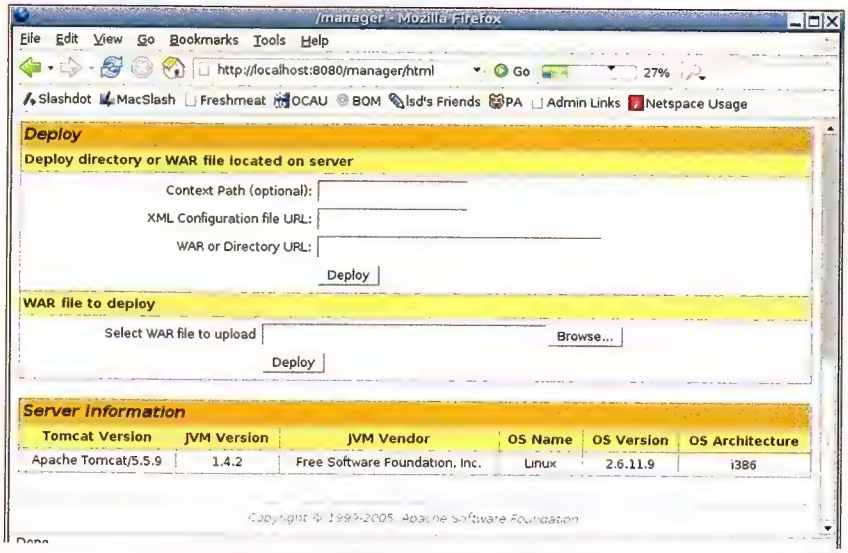
```
export PATH=$HOME/gcc/dist/
      bin:$PATH
export LD_LIBRARY_PATH=$HOME/
      gcc/dist/lib:$LD_LIBRARY_PATH
```

You should now be able to run your GCC 4.0 install:

```
gcc-4.0 --version
```

Compiling apps using your new GCC is easy enough – if you didn't use the **--program-suffix** option, and you've altered your PATH as shown, then your new GCC will be called 'gcc' and will be executed in preference to any version installed on your system. Otherwise, you'll need to tell configure scripts to use GCC 4.0 explicitly:

Free Java – GCJ



▲ **Apache's Tomcat Java servlet engine runs quite nicely under GCJ.**

One of the least known parts of GCC, but one of the features that's seen the most improvement in 4.0, is its Java compiler. GCJ can compile Java source code and binaries in to native executables that can be run just like any other compiled program. It also includes an interpreter called GIJ that can run Java bytecodes directly, though much more slowly than if they'd been compiled with GCJ.

In GCC 4.0, GCJ's Java library has been merged with the work of the GNU Classpath project, dramatically improving the range of applications that it can run. In fact, GCJ 4.0 can run major applications like Eclipse, an advanced open source IDE, and Jakarta Tomcat, Apache's Java Servlet engine.

Compiling a simple Java application to a native binary is easy:

```
gcj Test.java –main=Test -o Test
```

This works well for simple apps, but building complex apps in to native binaries often requires patching the code to handle GCJ's methods for loading extra classes. However in GCJ 4.0 you can compile Java libraries (.jar files) into native libraries, and then run applications under the interpreter. When the interpreter loads a library that you've precompiled, it transparently runs the native code, letting you partially or fully precompile large applications without having to patch them.

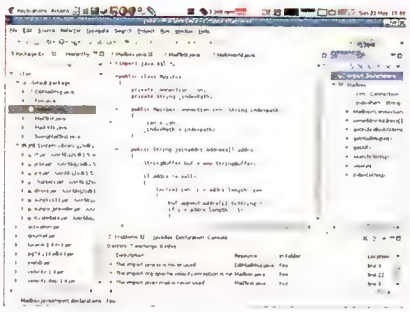
The Java libraries are mapped to their native versions using a database, which you can build with the 'gcj-dbool' command. To run Eclipse natively, try this script from inside your eclipse folder to run over all its jars and compile them:

```
gcj-dbtool -n eclipse.db

for JAR_FILE in `find -iname "*.jar"`
do
echo "Compiling ${JAR_FILE} to
native"
gcj -shared -findirect-dispatch -Wl,-
Bsymbolic -fjni -fPIC -o ${JAR_FILE}.so
${JAR_FILE}
gcj-dbtool -a eclipse.db ${JAR_FILE}
${JAR_FILE}.so
done
```

Then, use this command to fire it up:

```
./eclipse -consoleLog -debug -vm gij
-vmargs -Dosgi.locking=none -Dgnu.
gcj.precompiled.db.path=eclipse.db
```



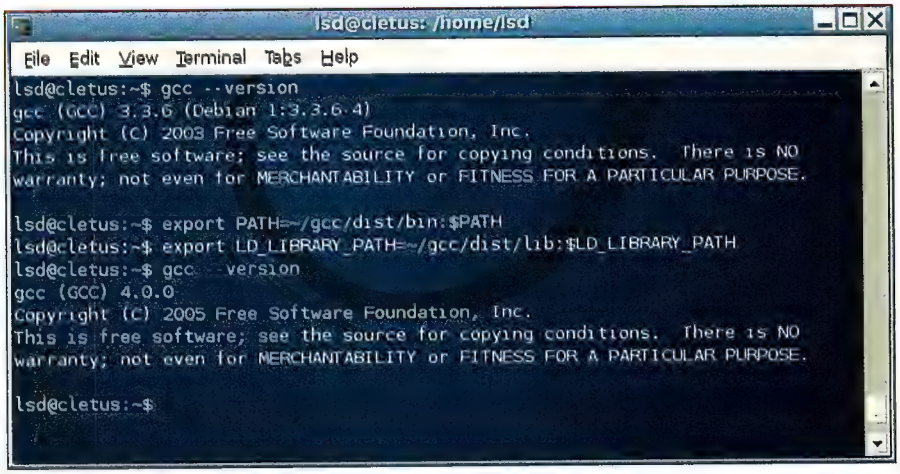
▲ **The massive, all-powerful Eclipse IDE running under GCJ – a great tool for developers.**

```
CC=gcc-4.0 ./configure
```

Having to type those export commands into your shell gets old pretty quickly, but you can make life easier by placing these commands in to your ~/.bash_profile file, applying them automatically to every login. If you'd prefer to keep the use of your new GCC optional, put the commands into a text file and use the 'source' command to read those commands into your shell session when you need them:

```
source ~/gcc/setup.sh
```

And that's it. The power of GCC 4.0 is yours!



With a few quick shell exports your new GCC is up and running in style.

GCC 4.0 performance

Given that GCC 4.0's main claim to fame, Tree SSA, promises to usher in new levels of performance, we just had to thrash the life out of it in the name of benchmarks. We compiled a few key applications under both GCC 4.0 and GCC 3.4 and compared the performance of the resulting binaries, and for the Gentoo readers, we looked at the compilation times as well. Because GCC supports so many different CPU architectures, testing just on x86 wouldn't really do it justice, so we tested on AMD64 and PowerPC as well.

Test systems:
x86 and AMD64: Athlon 64 3200+ (Winchester core), 512MB RAM, Debian unstable.
PowerPC: 1GHz Apple Powerbook G4, 512MB RAM, Ubuntu 5.04 (Hoary Hedgehog).

Compiled application performance

GCC 3.4 vs GCC 4.0

Compression	x86	AMD64	PowerPC
GCC 3.4	86.20	71.10	154.15
GCC 4.0	82.01	73.96	145.99
Improvement	105.1%	96.1%	105.6%

Decompression	x86	AMD64	PowerPC
GCC 3.4	17.64	15.16	33.69
GCC 4.0	17.34	15.18	33.79
Improvement	101.7%	99.8%	99.7%

bzip2 Linux kernel source test, time in seconds (lower is better).

GCC 4.0 puts in a good showing with bzip2, boosting compression performance by about 5 percent on both PowerPC and x86, though AMD64 sees a slight drop. Decompression doesn't seem to be affected much at all. Next, onto LAME MP3 encoding.

	x86	AMD64	PowerPC
GCC 3.4	255.02	311.72	919.33
GCC 4.0	256.37	322.73	880.35
Improvement	99.5%	96.6%	104.4%

LAME 3.96.1 MP3 encoder album encode test, time in seconds (lower is better).

Encoding is very CPU-intensive, and again GCC 4.0 shows a small but significant boost on PowerPC, though a similar drop in performance on AMD64. x86 performance seems much the same, probably because of the ASM optimisations in its core, making its performance less dependent on compiled code.

	x86	AMD64	PowerPC
GCC 3.4	1737.88	1456.24	5892.83
GCC 4.0	1745.34	1589.43	5755.63
Improvement	99.6%	91.6%	102.4%

POV-Ray 3.6.1 standard benchmark, time in seconds (lower is better).

POV-Ray is another CPU-intensive test, and unlike LAME and bzip2 it's written in C++. PowerPC sees another small gain, while x86 remains unchanged. The big shock is the large drop on AMD64. Looking at these results it's hard to recommend GCC 4.0 for 64-bit early-adopters at the moment.

	x86	AMD64	PowerPC
GCC 3.4	21.86	21.44	52.61
GCC 4.0	23.27	25.28	58.28
Improvement	94.0%	84.8%	90.3%

LAME 3.96.1 compilation, time in seconds (lower is better).

Compiler performance

GCC 3.4 vs GCC 4.0

Compiling LAME, a C application, on GCC 4.0 takes longer on with GCC 3.4 across the board, but particularly on AMD64. When comparing compilation times, it's important to remember that the compiler has been built using a version of itself, so any performance gains or losses in compiled application benchmarks will be reflected in the compile times as well. This may explain why AMD64 takes more of a performance hit here.

	x86	AMD64	PowerPC
GCC 3.4	74.06	70.21	218.78
GCC 4.0	64.16	66.08	199.51
Improvement	115.4%	106.3%	109.7%

POV-Ray 3.6.1 compilation, time in seconds (lower is better).

Finally, a conclusive win for GCC 4.0! A lot of work has obviously gone into the C++ compiler, with each architecture showing a solid performance boost with GCC 4.0. For KDE fans running Gentoo, GCC 4.0 could be your new best friend.

GCC 4.0's performance seems to be a bit of a mixed bag at the moment, boosting performance in some tests while coming in slower in others. AMD64 users might want to keep away for the moment, but anyone compiling a lot of C++ code will benefit from shorter build times.

It's still early days for GCC 4.0 though, and it'll take the developers a while to get up to speed with the new Tree SSA infrastructure and to make full use of it. Hopefully we'll see some more benefit from it in GCC 4.1. Happy compiling!

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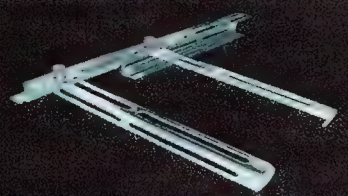
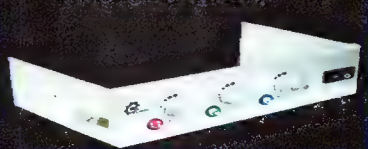
WHEREVER PCI RACK

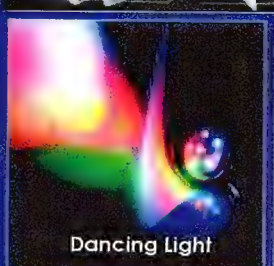


SAMURAI

CHAMELEON



LIGHTBUS



MINIBAYBUS

TRANSFORMER

Little LAN that could

If you enjoy playing with plastic boxes and LEDs, then Steven Macerak Jnr can show you how to make your own LAN cable tester for a measly $6!

Ever been to a LAN where dodgy Cat 5 cables are more common than dodgy CD keys? Unless you own a pricy cable tester (from $70 to $300) the most common way of testing a cable for continuity has been the trusty multimeter. But whipping out a multimeter at a LAN is like whipping out the old fella at a urinal (sure most of us have one, but it doesn't mean we want others to see it. Er, right?)

The point is that a LAN cable tester is dead easy to build and it's cheap. Further, the project is a no-brainer and the perfect way to make use of a lazy afternoon.

The problem

The job of a network cable is to allow packets of data to travel efficiently between two points, and arrive intact. Network failure typically occurs because of damaged cables; connecting plugs; dodgy hubs; transmission losses (line noise) or damaged/incorrectly setup PC drivers.

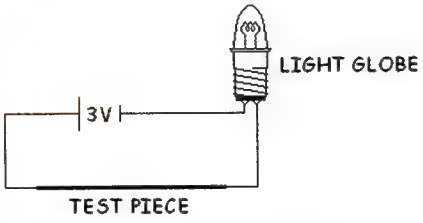
This project will only deal with the first situation, the rest is up to you!

A damaged cable (or plug/socket) refers to a physical break in a transmission wire somewhere along the cable's length (called an 'open circuit'). The break means electrical signals can't get through and your PC will drop out of the network (error: signal lost).

Cables, plugs and sockets get damaged from abuse and rough treatment. You shouldn't park your chair on a cable, bend it in tight loops or yank a cable out by the cord. Of course, the most likely cause of failure is simply a crappy crimping job.

The solution

To test for a break in a wire we can do a continuity test. The simplest form of this is a light globe and a battery. If the length of wire under test is unbroken then the globe will light up. If the wire has an internal fracture the globe stays off. Dead easy right?



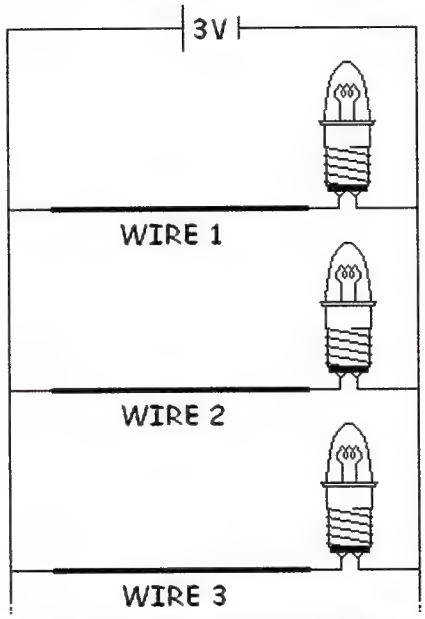
▲ **A simple circuit. You could even call it your first circuit.**

In the above diagram we have a single globe and therefore we are only able to test one wire at a time.

Cat 5 (and Gigabit Cat 6) LAN cables have eight wires so we'll design a parallel circuit to test all eight wires simultaneously. And we won't bother using expensive, inefficient globes – we'll use LEDs.

Our project is designed around 2x AA cells (3V) and LEDs with 2.1V, 15mA power ratings (according to the Jaycar catalogue).

LEDs need a current limiting resistor (placedin series) or else they'll fry from an excess of current. To find a suitable current limiting resistor we need to use Ohm's law – $V = I \times R$, where V is the excess voltage across the resistor (Supply Voltage – LED Voltage Rating), I is the desired current (in amps) and R is the required resistor value (in ohms or Ω).



▲ **Yeah, it's a slightly more complex circuit. It's also better.**

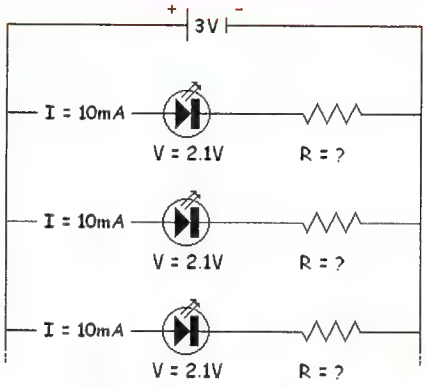
As we need to find resistance we rearrange the equation to be $R = V / I$. And don't forget that 15mA is entered into the equation as 0.015 and not 15.

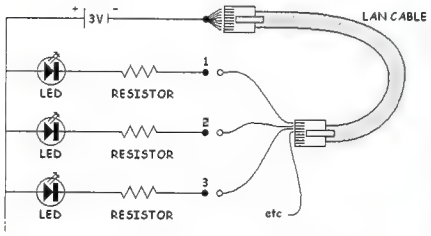
We have eight parallel loops so we only need to work through the equation once (all eight LEDs will with have identical currents). So:

Supplies

All parts and prices are from Jaycar Australia

1x HB-6015 Black UB5 (83x54x31mm) Jiffy Box	**$2.50**
2x PS-1478 (x2) RJ45 8P/8C PCB Modular Socket	**$1.70 each**
8x ZD-0100 (x8) 3mm Red LED	**$0.20 each**
1x PH-9202 AA Cell Battery Holder	**$0.73**
1x RR-0543 62 1/2W Resistor (8 pack)	**$0.38**





▲ **Oh... tricky. Well, no more tricky than your local power grid.**

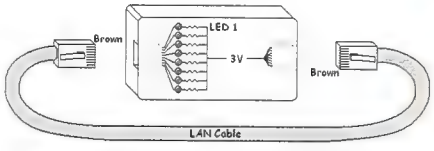
R = (Supply Voltage – LED Voltage Rating) / Desired Current (in Amps)

R = 3V - 2.1V / 0.015A = 60

But nobody sells 60Ω resistors. The closest 'standard size' is 62Ω which is good enough anyway. We'll need 8 resistors and you can usually get them in packs of eight. We got ours from Jaycar, and note that they seem to be phasing out the cheaper 1/4W resistors ($0.30c) for 1/2W versions ($0.38c).

Build them up, buttercup

This is the simple parallel circuit we need to build. One end of the LAN cable is connected directly to the battery (all eight wires combined together), while the other end of the LAN cable gets connected to each LED and resistor. Here's a diagrammatical view:

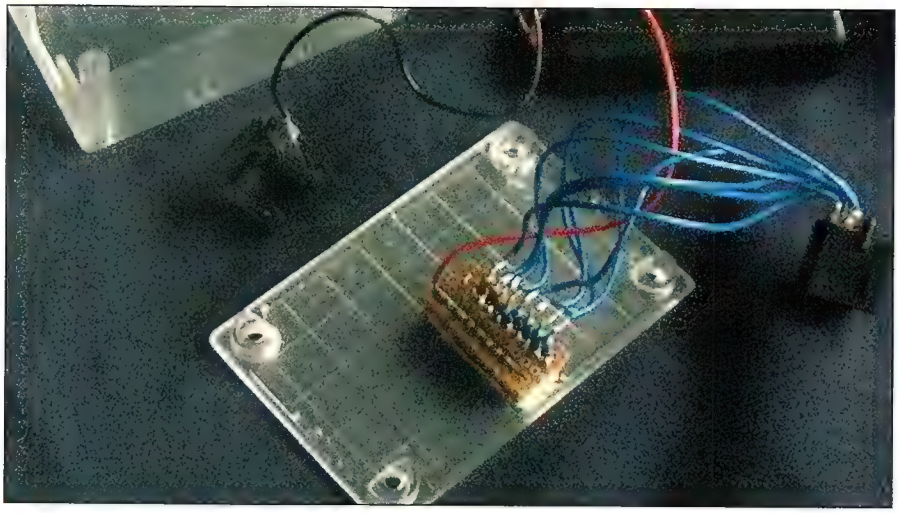


▲ **Ph33r the drawing skillz.**

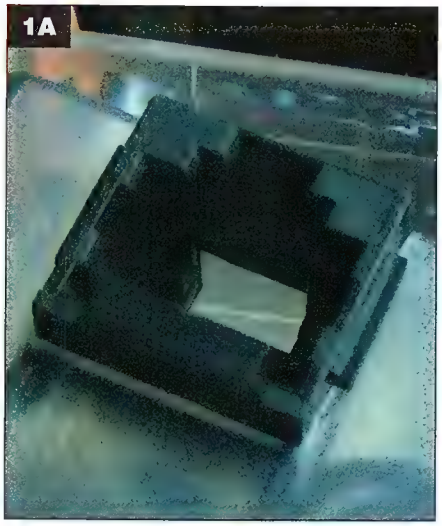
Be aware that the LAN plug going into the left-hand side of the circuit will correctly align with the LEDs (ie the top, brown wire will light up LED 1, etc). On the right-hand side it's in the opposite order! Therefore the LEDs should be mounted closer to the left end of the Jiffy Box to avoid mix-up. But – and it's a biggie – let's say that LAN wire 4 is broken (LED 4 does not turn ON, indicating an open circuit somewhere along the 'blue' LAN wire). What are you going to do? You'll most likely re-crimp the LAN plugs again (one end at a time). If the LED works it means one of the plugs was a dud. If the LED is still OFF then you'd probably turf the entire cable (or re-crimp it into smaller lengths – unless you have multiple fractures along the LAN cable).

What's in the box

There are four things we need to do to the Jiffy Box: cut 14mm x 15mm openings for the LAN sockets; drill 3mm holes for the LEDs; trim the edges from the screw mouldings, and shave and scrape the lid and the seal to make sure it fits. Oh, and you can always give it a paint job if you're artistically inclined.



▲ **Be sure you connect the LEDs up correctly, or it won't work. And that's bad.**

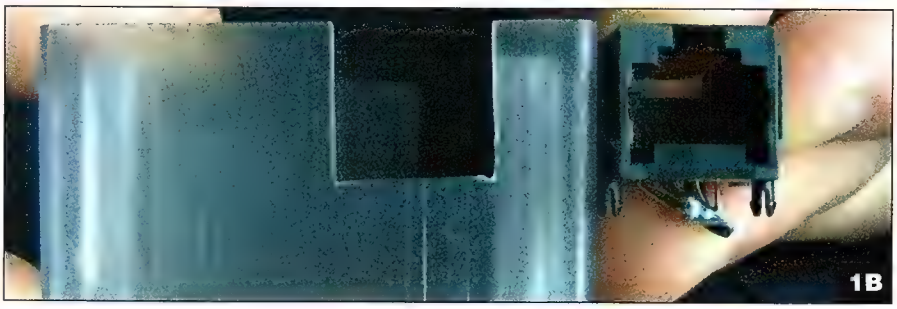


▲ **You shouldn't need any glue.**

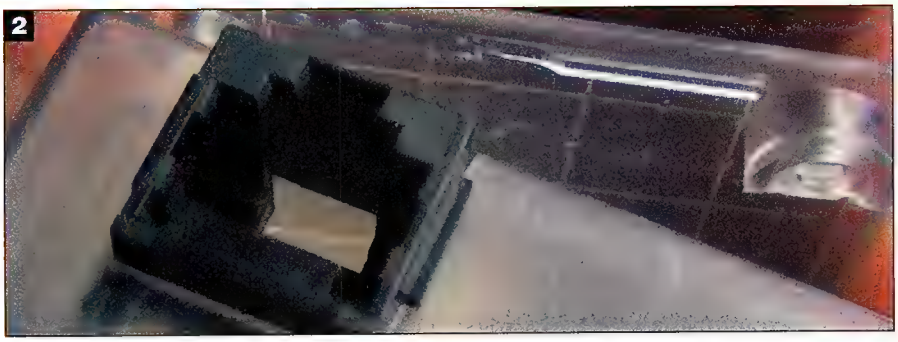
The openings for the LAN sockets should be 14mm high by 15mm wide. Use a hacksaw or Dremel to cut these openings. If you place the opening at about 10mm from the edge of the Jiffy Box then the 'internal Jiffy leg' will push against the socket, wedging it in place. There are two further things that stop the socket from falling out. Firstly the LAN sockets have some moulded 'details' on their sides that 'grip' the 14mm x 15mm opening. In the photo here we see the 'outer' and 'inner' moulding that 'locks' the socket and jiffy box together.

Secondly you'll find that screwing the Jiffy lid down will trap the socket in place.

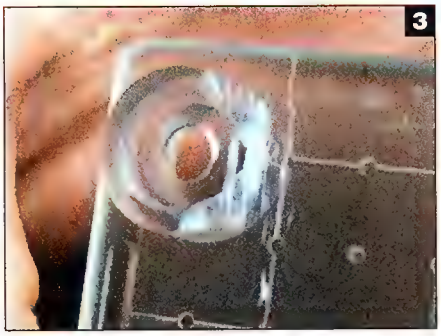
All of this means we don't need to glue the socket into the opening (and a glue joint would probably crack anyway).



▲ **Make sure you cut into the box well so the socket is a snug fit.**



▲ Scrape away at the ridge so that the lid sits properly.

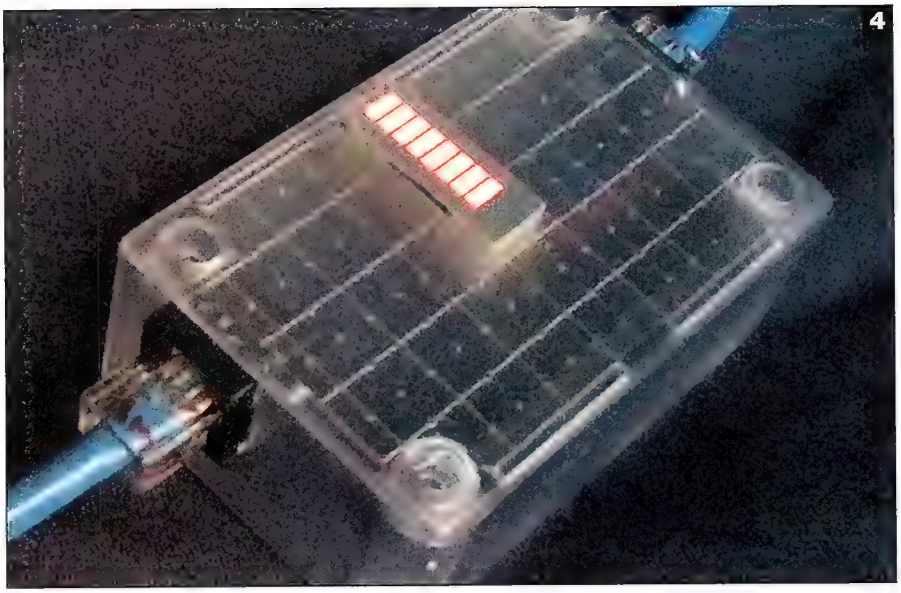


▲ Clean up the screw holes as well.

With such a tight fit between the LAN socket and Jiffy lid we'll need to scrape away the plastic 'ridge' on the underside of the lid (use a hobby knife).

In the same two corners as the LAN sockets, we need to trim away some of the lid's screw moulding. This will allow the lid to close properly.

Drill a neat, vertical row of 3mm holes for the LEDs to sit in. Use superglue for LED mounting. As you can see we've used a more expensive LED bar graph. This needs a rectangular hole of 10mm by 25.5mm. When drilling 3mm holes use the Jiffy's 'blind pilot holes' as the drilling locations. This will evenly distribute the holes and accurately line them up. Don't forget we want the LEDs closer to one end of the jiffy case.

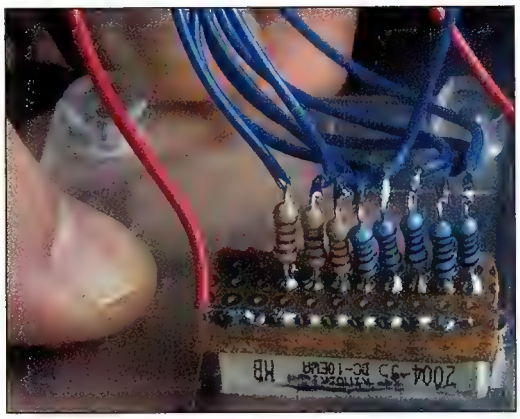


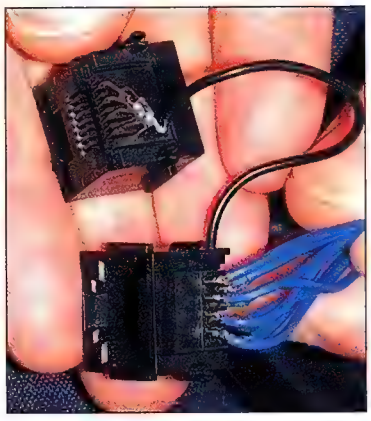
▲ Modern technology is a wonderful thing. It can even test LAN cables!

Solder up soldier

Begin by soldering the LAN sockets. Next, solder a resistor to the positive leg (anode) of each LED. Mount the LED to the Jiffy lid (ie. push the LED through the 3mm hole on the lid). Fix it with superglue. Make sure that the LEDs don't touch each other (or cross legs) to avoid short-circuits.

This LAN socket has its leads soldered together (and then joined to the negative battery lead). Each of the eight 10cm wires are carefully soldered to each lead. Each resistor gets soldered to a wire from the LAN socket. Keep the LEDs and LAN wires in order. The 'top-most' LED gets soldered to the 'top-most' LAN terminal, etc. The other end of the LEDs (negative legs) should get soldered together. Join them to the negative battery lead and you're done!





▲ Each LED will need a resistor. Or else they'll explode. Fantastically.

Pointers

Before sealing the box check for loose wires that can cause shorts. Use electrical tape to insulate bare joints and hold things together or apart.

With a new set of batteries the unit is ready to go. You will see that plugging in a LAN cable completes the circuit and makes the LEDs glow (fingers crossed). This means we don't need an ON/OFF switch either. You now have a sturdy/cheap LAN cable tester that's guaranteed to attract the opposite sex. Naturally, this also depends on the clothes you're wearing, and the time since your last encounter with a bar of soap.

One possible mod to this design is the substitution of an LED Bar Graph (Jaycar cat#: ZD-1704, $3.95) instead of eight LEDs. We're not sure what the exact current rating of these LEDs is so use 100Ω resistors to keep current at 10mA (which is bright enough for this purpos anyway). Have fun!

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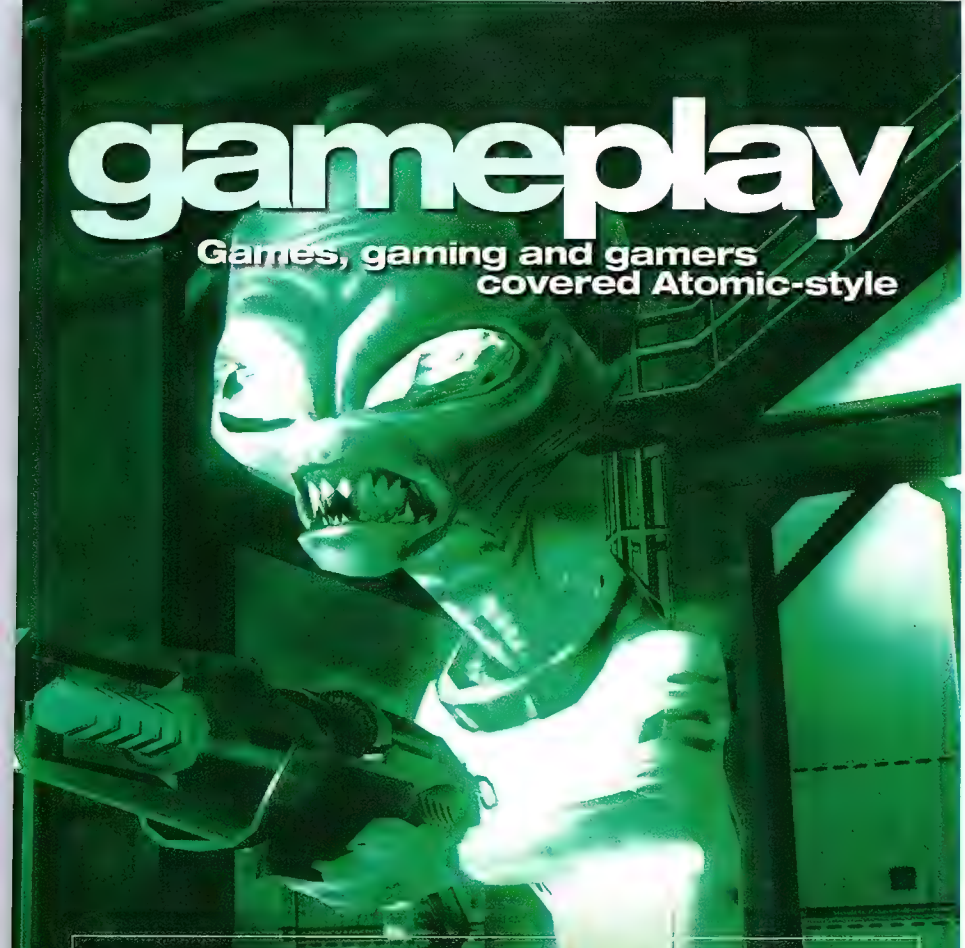


Everything is about sex these days. Now, I realise this statement isn't exactly original. I also realise that, of all the things I could possibly talk about in an editorial, especially one about games, sex is really the last thing you'd expect to see here.

But it's in games. And it has been for some time.

Ignoring Leisure Suit Larry (bless his bones) games have become progressively more seedy. Developers are getting away with more, publishers are becoming lenient and the government still has no idea what's going on.

It's a well known fact that boobies sell. The thing is that if you put *more* than boobies into a game, you won't make it to the retail shelf. There's also the question as to whether a game containing illicit material would actually sell, considering the latent ingenuity of your average 12-year old to shove said title under his shirt, only to reveal it quickly to the salesperson in order to get the barcode read.

You see, sex, as open as we are in today's society, is still taboo. Buying a game with nudity is akin to sneaking a copy of *Playboy* out of your local newsagency without your mum, close friend [illegible] slamming hottie from next door spotting you.

So instead, most games rely on using sex in a clandestine manner – ie. censoring. It's a sad truth that people get off on their showering Sim or almost-naked World of Warcraft character. In fact, the first thing most guys do when they buy a game is roll a female character and disrobe them as fast as humanly possible.

What evidence is available to support this? The multitude of nude patches online for games like Tomb Raider, Morrowind, The Sims, Drakken... the list goes on. The latest addition is the PC version of GTA: San Andreas, where you can now dispense your own brand of 'Hot coffee' to your harem of lovers.

Do I think this is a bad thing? Well, not really. The sooner we come to terms with our primal urges, the better.

Just don't show that slamming hottie your nuded-up Night Elf making out with an owlbear and you'll be fine.

Unless they dig that interspecies stuff.

Think Logan needs a new photo? Cast your vote!
logan@atomicmpc.com.au

this month

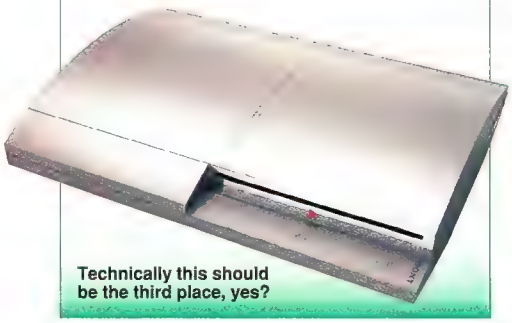
gamereviews

short circuits

ATI has released version 5.6 of its CATALYST video card drivers. Some, but not all of the changes in the new drivers include: more efficient memory usage in Doom 3; Call of Duty optimisations; better storage of vertex data in Chronicles of Riddick, as well as a number of Z-buffer optimisations that will work for a range of different titles. If this wasn't enough, according to ATI, version 5.7 of the CATALYST drivers will include support for the company's multi-card technology, Crossfire.

First the Playstation Portable and now the Nintendo DS. Hackers have found a way to download games off the mobile console's memory cartridges and make them freely available on the internet. All users have to do is install their choice of game onto a special rewritable memory card and play away. How Nintendo will react to this news remains to be seen, however, Sony has released an updated firmware for the PSP to make playing illegal games impossible. Now all it has to do is get users to download it...

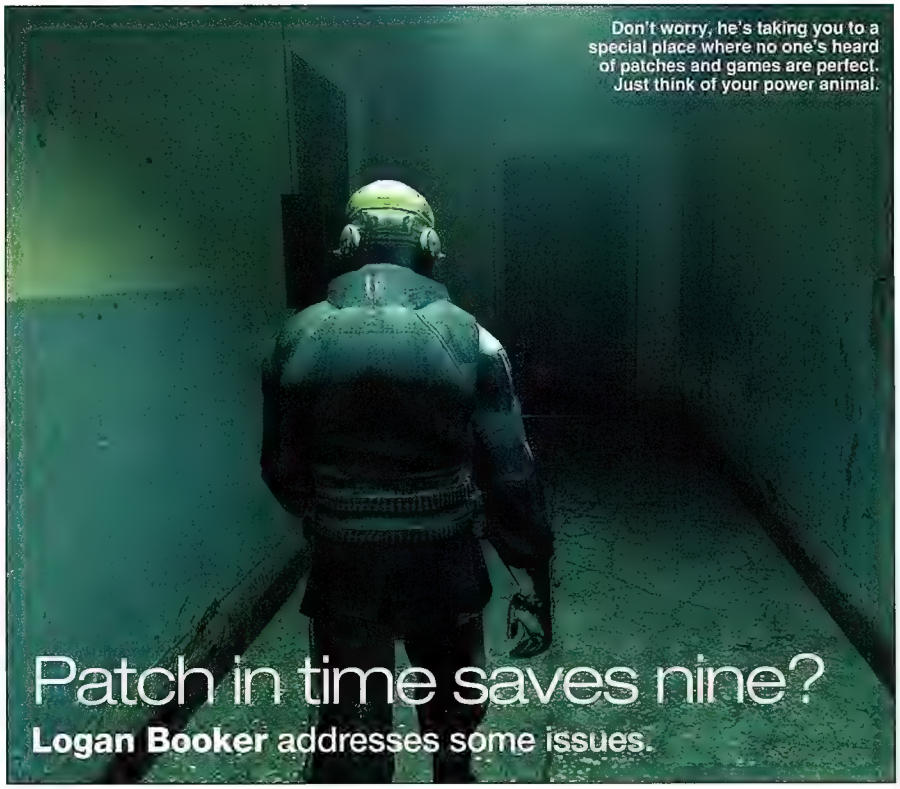
If you were happy to hear that Linux was available on the Playstation 2, then you should be equally excited to find out that the Playstation 3 is capable of running the free OS as well. Although there's nothing super official, Sony Computer Entertainment president Ken Kutaragi let slip in an interview that the unit is more than able to run any OS you care to install on it. The only problem? The PS3 doesn't have a hard drive – but that doesn't rule out that there will never be one...



Technically this should be the third place, yes?

scan

Industry and online news for the complete gaming enthusiast



Don't worry, he's taking you to a special place where no one's heard of patches and games are perfect. Just think of your power animal.

Patch in time saves nine?

Logan Booker addresses some issues.

Patching is an accepted consequence of our condition. What condition? Being a gamer, that's what.

The interesting thing is that, up until the release of the Xbox, updating was for PC gamers only. In fact, some took pride in knowing that patching was a unique facet of owning a gaming PC and using it for, well, games. Patching sometimes brings new content, and that was an awesome thing to hold over the couch-bound joypad aficionado.

Why do developers release patches in the first place? Well, it depends on the game. Many developers release patches to fix bugs. New hardware and software is released, something breaks, it needs to be fixed. Take for example System Shock 2. When Windows XP came out, SS2 refused to work on computers using the operating system. It wasn't until the game received a patch that it once again became usable under Microsoft's flagship OS.

In this day of massively multiplayer games and indeed, the console market, the definition of a patch is changing. No longer is it the big can of whoop arse designed solely to make the bad men in your PC go away, patches now bring new quests, maps and powers to your choice of gaming poison.

Owners of the Xbox version of Pariah can now download maps made by other users that are, in essence, custom updates. Those consolers with Splinter Cell can download extra missions straight to their Xbox hard drive. PC users who play World of Warcaft, Everquest II or to a lesser extent Planetside, wait with bated breath for the source developer to disgorge another fun-filled patch to make their class better than every other class (or more likely, crap-coated crap with crap filling). Regardless of how you choose to spend

Patching sometimes brings new content, and that was an awesome thing to hold over the couch-bound joypad aficionado.

PERIPHERALS FOR THE SERIOUS GAMER JOYTECH

atomic

your time, online content delivery is quickly becoming the way of the future, and that's why it's on consoles, and why it'll be a big part of the Xbox 360 (and should be a part of the Playstation 3, once Sony gets its online strategy together).

It's also becoming a way for developers to release games that aren't completey finished. Some could use Blizzard's WoW as an example. But really, no game ever released is perfect, and the only title that comes close is, oddly enough, Blizzard's Starcraft. Today, dedicated RTS fans will swear it's the most balanced strategy title available. And it only took what, seven years for it to achieve that?

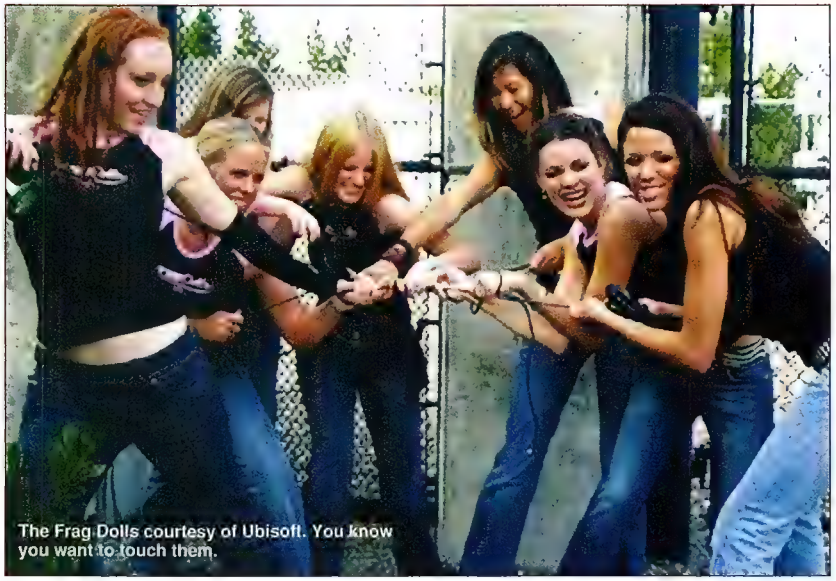
Regardless of the power patching gives developers, it shouldn't become an excuse to release games that need more work. Unfortunately, it's never really the developer's choice as to whether a game gets released when it's finished, or *acceptably finished*. It's the publisher's.

The rules of game development and distribution are changing. It started with Half-Life 2 and it shows no signs of slowing down. Patching, updating, content delivery – whatever you feel like calling it – is the new, hot thing. While patches will always be there to fix things when Games Go Wrong, expect them to now make games better.

Well, that's the hope anyway.

geekette

A girl's-eye view of the gaming world


The Frag Dolls courtesy of Ubisoft. You know you want to touch them.

E3. Synonymous with cutting-edge technology, previews of the latest games, and hot chicks in revealing outfits.

Yep, love them, or love to hate them, booth babes play an integral role in games society. Hardcore gamers flock in droves to the booths staffed by these mysterious creatures. No doubt buoyed by the hope that they may even win one of their own *a la* SRS Racing.

They are happy to run the gauntlet of whatever these nubile princesses have on offer, snug in the belief that their technological prowess will override their lack of physical and social presence, and they will in turn become irresistible.

As effective as this consumer mating dance has been in the past, it simply wouldn't be E3 without the opportunity for change and improvement, and this year a Wonderbra-enhanced rack wasn't the only thing to stand out and hog the limelight. It seems the booth babes have evolved into something all the more exciting – slammin' hotties in tiny T-shirts who can actually play games.

Enter 'Frag-Dolls' – an all-girl gaming clan put together by Ubisoft to represent its products and one of the highlights of this year's conference. The fact that they were hand-picked for their promotional model looks as much as their game savvy, has not come without controversy, with people labelling them as little more than glorified booth babes. But isn't that the point? They are there to attract attention to a product, and if they can do this with a bat of their perfect eyelashes, while slaughtering their competitors with a 95 percent win rate, who are we to question how they got there?

Perhaps the idea behind the Frag-Dolls was inspired by the machinations of traditional schoolyard courtship, where in order to gain attention from the object of your affection, you pulled their hair or beat them up.

If that was the case, Ubisoft's ploy seems to be working. Those same boys who were leaving puddles of drool at the counters of various product displays, are now lining up to have their arses kicked by these precocious beauties, and walking away with a grin from ear-to-ear.

So, hate them if you must, but what appears to be working for this new breed of booth babe – apart from the fact you can actually have a conversation with her – is that instead of playing up to the girl, you get to play *with* her.

Kate Inabinet is currently an Animator at Atari Melbourne House. Prior to games development, Kate spent six years in advertising and short film. She studied at the AIE in Canberra where she is still involved as a mentor for the Women in Games Pathway, presenting regularly at conferences on the topic.

PERIPHERALS FOR THE SERIOUS GAMER JOYTECH

what's new

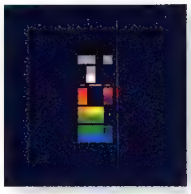
Mr & Mrs Smith
Brad Pitt, Angelina Jolie

Although it has all the signs of a Hollyworld blockbuster, the action and special effects hide a witty interior. Well, to start with anyway. While Mr & Mrs Smith starts with a full head of steam, following the lives of special agents John (Brad Pitt) and Jane (Angelina Jolie) Smith, the pacing goes awry towards the end of the film, and the scenes become more and more over-the-top. Great cinema viewing, but could have been better.

Octavarium
Dream Theater

This could possibly be their best studio release since *Six Degrees.* Combine the heaviest of rock backbones, sequenced keys, chalice-raising vocals and blisteringly quick guitar solos and you have the wall of rock that DT do so well. With each new listen you'll hear a riff, roll or roar you never thought was there. Your ears will bleed the good bleed. Notable tracks: **The Answer Lies Within, and Sacrificed Sons.**

X&Y
Coldplay



With the success of *Parachutes* and *A Rush of Blood to the Head,* Coldplay's third studio album was always going to be the most anticipated of 2005. Chris Martin's great writing ability combined with a mixture of melodies (What if) and rock (Square One), X&Y doesn't disappoint. With Coldplay slowly challenging U2 as the world's best rock group, X&Y is a great achievement from the English quartet. Notable track: **Fix you**

culture

Everything you need to know about modern film, music and literature


Plenty of rain, but not a lot of singing...

Garden State

Andrew Largeman has been separated from his emotions for most of his life, thanks to a drug cocktail prescribed by his psychiatrist father. It's only when his mother dies and he returns home after living in LA for nine years that he finally gets back in touch with his family, friends and himself.

In the meantime, he meets an energetic girl called Sam, who just happens to be a compulsive liar with a few of her own secrets up her sleeve.

Garden State is actor Zach Braff's directorial debut, and it's a damn good one, nominated at the Sundance Film Festival and well received by critics. If you think you recognise Braff, it's probably from his role as JD on TV's *Scrubs.*

Although many actors try their hand at directing, few write and act in their productions – and do it well. The music, casting and pacing are all spot on, and if there's any grievances to be had, its with the movie's conclusion which could have been stronger. Otherwise, this film comes highly recommended, if you feel like watching something seriously quirky.

Definitely check out the extras – there's nothing quite like a dog whacking off to get you in the mood.

Logan Booker

TITLE **Garden State**
STARRING **Zach Braff, Natalie Portman**
DIRECTOR **Zach Braff**
DISTRIBUTOR **Buena Vista International**
AVAILABLE ON **DVD**

'Someone has been pissing on my Gamecube and I'm about to close the case.' – Titembay

Tales of the Otori: Across the Nightingale Floor

Takeo is a young boy with special abilities inherited from his father who is a member of a mysterious group known as The Tribe.

After being abandoned by his family, Takeo is taken in by respected leader Lord Shigeru, and trained to be royalty. Taking the title of Lord Otori, he becomes the successor to Shigeru. During this time, he finds the love of his life, in young maiden Kaede and makes a lifetime enemy in the warlord Arai. This first book in the trilogy follows Takeo's trials from boy to young man.

It's a story crafted from a fusion of Japanese and Chinese culture, though it leans on the philosophy of Samurai more than anything else. This isn't exactly a bad thing, but Hearn's generalised approach means that many parts of the world he creates are not explored in great detail.

The pacing in the first two books is good but the third builds incredibly slowly, only to have an anticlimactic and somewhat rushed end. Seeing as Hearn takes great care with weaving the romance and betrayal, this was a disappointing finish.

Nonetheless, Hearn writes with an easy, digestible style and those who dig medieval oriental stories with a touch of the supernatural will enjoy *Across the Nightingale Floor.*

Logan Booker

TITLE **Tales of the Otori: Across the Nightingale Floor**
AUTHOR **Lian Hearn**
PUBLISHER **Hodder Headline Australia**

'The man who had been torn apart lay on the wet stones. I could just make out the features on the severed head. It was Isao...'

PERIPHERALS FOR THE SERIOUS GAMER JOYTECH

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fuzzylogic

A unique view on the crazy world of tech and entertainment

Class act

Ben Mansill is rated R. Yeah, baby.

Just recently we were invited to a press conference held by the OFLC and Attorney General Philip Ruddock. The topic: Computer game classification. The nature of the announcement itself however was shrouded in secrecy. 'Here comes the R!', we thought. What else could it be?

But no. It fizzed when it should have buzzed. The big deal is that we have all-new ratings stickers – colour-coded! After a 12-month international study, Mr Ruddock proudly announced that we, the clever country, now boast Kermit green for General, Bananas in Pajamas yellow for PG, blue-sky blue for M, red (not blood-red) for MA15+ and dead-of-night black for R18+ (films, not games). Cheers Phil.

Alas, there is still no R rating for games. When question time started, a clued-in journo from *Atomic*'s favourite TV news channel jumped straight in and wondered why games top out at MA15+? Mr Ruddock explained that the government had no faith that R games could, in the real world, be realistically kept inaccessible to youngins. Never mind that the same youngins would be sure to watch Dad's collection of *Evil Dead* DVDs when he was out bowling. Yes, hypocrisy and short-sightedness prevails, and the flames of outrage were again fuelled.

I remember when games were first thrust under the conservative spotlight, back in the day. I was working for Sega Ozisoft, the games distributor that had all the contentious titles that started this mess. Night Trap, Mortal Kombat, Doom 2, Phantasmagoria and Harvester. A different company had Carmageddon, the other video nasty, but we had the triumvirate of gaming evil and weathered the storm as it first grew. I attended the very first training and qualification session for games classification, back when senators were waving Mortal Kombat packaging over their halo-topped heads in parliament. The OFLC was coming to grips with games, and doing so impressively. The OFLC staff was then, and is now, an entirely reasonable, intelligent and open-minded group, but it is a mere police force, not a court.

The games we dealt with were not remarkably violent or sexual, no more so than games have ever been, but the dreaded new FMV allowed developers to show real blood and guts instead of a few red pixels, and the hint of real boobies instead of square pixel boobies. Developers were exploring the creative possibilities of the new medium. It was exciting to anticipate the new breed of games, once this classification nonsense had blown over. We all expected a short period of struggle, then an orgasmic bonanza of blood-soaked sex. Terrific!

But alas again, outrage over horrible games became an issue that stymied the global games industry. Today, developers have largely capitulated to the unmovable conservative powers. They have given up the fight.

Today's homogenised games won't take creative or commercial risks. There are exceptions, like the Postal series that thrives on the negative publicity it gets, but is the thrill of public notoriety worth it, against the truth that game sales will be next to nil, as no global territory will carry them?

It's rendered the call for an R rating a moot point. The OFLC cheerfully waves through almost all non-kiddy games as MA15+. Developers happily modify anything it objects to and creative integrity doesn't exist anymore.

Our greatest hope is that future governments will forget the past, see games as the 'safe'n'sterile' thing they've become, and wonder what harm an R rating could possibly be?

Ben wants to classify you!
Or you him. Whatever.
ben@atomicmpc.com.au

The dreaded new FMV allowed developers to show real blood and guts instead of a few red pixels, and the hint of real boobies instead of square pixel boobies.

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pipe

Keeping you up to date with previews of games in the pipeline...

Prince of Persia 3

Whole new world

The prince is back in yet another installment. While some may see this new game as a dead horse firmly flogged, PoP 3 promises refreshed gameplay alongside the fluid controls and slick combat of PoP and PoP 2.

One new addition is the prince/dark prince mechanic that has our royal protagonist switching between two types of characters at predetermined points. Along with cosmetic changes, the dark prince wields a chain weapon in place of his sword, which he can use to devastating effect. To complement this, the combat system has seen much polishing, making decapitating, stabbing and slaughtering all the more impressive.

The new game features a number of sub-games. While the E3 demo only showed the prince riding a chariot, cleaving foes with carefree abandon, chances are there will be a few more ancillary sections to keep things moving. Expect it before the year's end.

Release date **Q4 2005** Platform **PS2/Xbox**
Developer **Ubisoft Montreal**
Website **www.princeofpersiagame.com**

Project Gotham Racing 3

Hit the pace car

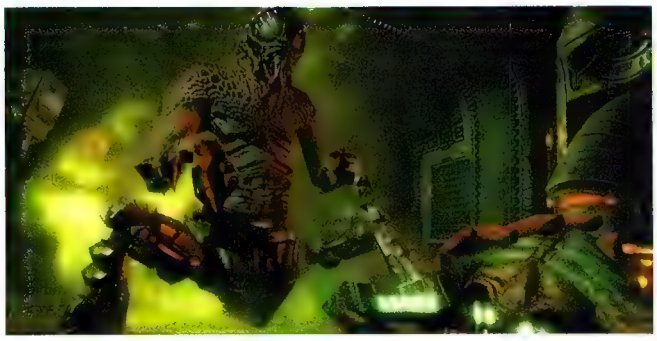
Ah... the smell of octane. As long as you're not somewhere excessively flammable, like a pile of hay or a giant pool of crude oil, then it really is the smell of smells, next to the delicate scent of napalm.

Seriously though, racing games have gained much popularity in the past few years and, while most of the hoo-ha can be chalked up to Gran Turismo, the Project Gotham Racing series has contributed quite a bit to the fad. These people, and other car racing game aficionados, will be happy to learn that Microsoft has a third title in the works for the Xbox 360.

If graphics were sugar then PGR 3 would be a giant tub of candy floss. Cars look more real than they have before, to the point where it's becoming incredibly hard to tell them apart from the cars themselves.

At this point in time, Microsoft promises almost limitless amounts of content in the form of unlockable tracks and cars, so it should keep everyone who picks up one of the company's consoles (and indeed the game) busy for some time. Well, until the next GT comes out.

Release date **Q4 2005** Platform **Xbox 360**
Developer **Bizarre Creations**
Website
www.microsoft.com/games/projectgotham



Prey

They cut the power

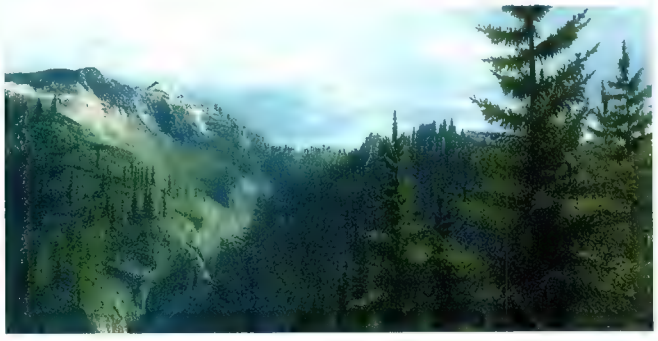
It's the game that just won't die. After a six-year absence from the scene, Prey is back with a vengeance. No longer being developed internally by 3DRealms, Prey has found a home at Human Head Studios, and id's Doom 3 engine.

The original focus of Prey back in the 90s was the technology. Destructible objects, worlds-in-worlds... crazy stuff like that. Seeing as most of this has already been done, Human Head has instead worked on getting the characters and story up to scratch in id's engine.

The player, a Native American ex-Ranger named Tommy, is tasked with saving his family from aliens. As the game progress, Tommy learns more about his rejected heritage, as well as acquiring bigger weapons and fighting harder enemies. According to the developers however, Tommy is very much the anti-hero, and it's only his desperate situation that forces his hand.

The developers also say the game will focus on close-combat fighting against small groups of enemies in order to take advantage of the Doom 3 engine, which is well-known as a corridor-centric FPS platform. Right now, we expect it'll play like a polished version of Doom 3 – it's just as dark and atmospheric, and doesn't look terribly different.

Release date **Late 2006** Platform **PC/Xbox 360**
Developer **Human Head Studios**
Website **www.prey.com**



Alan Wake

Richard Kinnell

We hate to sound like an NVIDIA press release, but we've arrived at the dawn of cinematic gaming. We're not literally *in* Dawn though; no, that would be gross. Naughty people.

Double entendres aside, Remedy's next title, Alan Wake, looks to be one heck of an experience, not to mention strong supporting evidence for the statement at the start of this preview. The one about press releases... not Dawn. People... please!

The title follows the story of bestselling horror writer Alan Wake, whose fictional nightmares are fast becoming reality. Sounds like something straight out of a Stephen King novel, right? Well, it kind of is.

Using a proprietary lighting engine, Alan Wake will make the scary even scarier, and – if you can believe it – the awesomely breathtaking scenes even more awesomely breathtaking. The title is being developed, luckily for us, on the PC, but it will also see a launch on the Xbox 360. Of course, we'll try and get more coverage on this title as development continues, so try to stay awake. Geddit? A-Wake? Oh forget it.

Release date **TBA** Platform **PC/Xbox 360**
Developer **Remedy**
Website **www.alanwake.com**

Gothic 3

I'm a hacker!

Look at that damn screenshot. Games don't get much more hot than that, unless you're trapped in your PC, *Tron*-like, battling beams of light and dealing with the male equivalent of camel toe. Regardless of how you look in a flimsy skintight jumpsuit, Gothic III, like Gothic II, is set to bust a groove in the role-playing space. Information is scarce at the moment, but damn, it looks sugary sweet already.

Release date **Q4 2005** Platform **PC** Developer **Piranha Bytes**
Website **www.gothic3.com**

Bully

And that foot is me

It's just like Rockstar to innovate on its own work, and Bully is expected to be a step beyond the studio's Grand Theft Auto series, while oddly enough, being smaller in scale. Much smaller.

Instead of taking the role of a mass-murdering, thieving, unscrupulous gangster, Bully puts you in the shoes of, you guessed it, a Bully. It's up to you to nurture a schoolyard romance, make fun of teachers, and beat up other kids. The game should provide a refreshing change from the quickly growing stale GTA franchise.

Release date **Q4 2005** Platform **Xbox/PS2**
Developer **Rockstar Vancouver** Website **www.bully.com**

The Witcher

As you wish

We all had fun playing Neverwinter Nights, right? Well, The Witcher should satisfy. Using Bioware's Aurora Engine, developer CDProjekt has created a large, beautiful world filled with vampires, werewolves and ghouls. As a Witcher, you've been trained from childhood to be a strong, talented warrior, and it's your job to fight the evil denizens until they can't fight anymore. CDProjekt has implemented Karma physics into the Aurora engine, along with a bunch of new, fancy effects to give the aging technology a new lease on life.

Release date **TBA** Platform **PC** Developer **www.cdprojekt.com**
Website **www.thewitcher.com**

Vietcong 2

I love the smell...

Rounding out what's currently an FPS bonanza this month is the sequel to VietCong. Along with a new assortment of missions involving the death of undoubtedly many hundreds of virtual North Vietnamese communists, developer Pterodon promises a spunky new graphics engine (see the screenshot for added spunkiness) and a bunch of fresh multiplayer modes – because there's nothing quite like ganking your mates with their own battered Simonov or showing them your very own punji stick pit.

Release date **Q4 2005** Platform **PC** Developer **Pterodon**
Website **www.pterodon.com**

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HUNDRED DEGREES OF FREEDOM

Logan Booker grills Deep Shadow's founder and director Sergey Zabaryansky on Boiling Point: Road to Hell.

One of many Holy Grails of games development is open-ended gameplay. Much like the assortment of precious-metal, wood and pewter crucibles at the end of *Indiana Jones and The Last Crusade*, open-ended gameplay has many forms, some more appealing than others. To one player, it's an in-depth character creation system while for another it's a never-ending supply of people to converse with. For yet another it's a massive collection of quests to complete, and for someone else a world you can literally get lost in.

It is the ambitious developer that has a go at getting all of these elements into a game – and getting it right. And that's exactly what Deep Shadows has attempted with its latest title, Boiling Point: Road to Hell.

Mixing it up

'Working on the game we have tried to meet the requirements of two genres – action and RPG,' says Sergey Zabaryansky, founder and director of Deep Shadows. 'When we speak about the RPG, we mean a 100 percent RPG with the ability to play different roles, not only elements of an RPG.'

Zabaryansky was executive producer on Codename: Outbreak, developed by STALKER creator GSC Gameworld. Boiling Point is his second title and the first for newly-minted Deep Shadows.

Boiling Point is about Saul, a mercenary whose daughter has gone missing. It's up to the player to investigate her disappearance with both mind and munitions.

We especially like what you've done with the garden.

Never fear, Boiling Point is not just about killing hundreds of people – you get to talk with them as well. In fact, the guys you'll end up fighting are determined by your social interactions. Time to practise your James Bond impersonation.

This of course leads to various subplots that you are free to pursue (or not), the ultimate objective being the rescue of Saul's daughter.

A formidable range of options are available for the action and RPG player alike. Along with a 'wicked' AI and a 'rich' arsenal of weapons, the game features an experience point system that will allow the player to improve their abilities.

'The experience system in the game is skill-based – but only the skills used can be upgraded. For example, if you constantly use the SVD [weapon] – your accuracy with this weapon increases. The more you walk, the stronger your health; if you carry many heavy things, your strength parameter increases too. When one of your parameters improves, you can buy a good upgrade, new weapons, etc,' explains Zabaryansky.

Weapons can also be improved. 'There are about 20 types of barrels in BP, and they can be upgraded – players can even improve such parameters as fire rate, armour-piercing, clip capacity and so on.' However, Zabaryansky makes it clear that Boiling Point is more than just an FPS with gun upgrades. '[It] is a mix of RPG and action FPS, and much more comparable to games like Morrowind, Gothic [and] Operation Flashpoint.'

'Role-playing lovers will find BP offers a developed system of dialogue and trade [as well as] the ability for main character upgrades,' he says.

Mission impossible

A key aspect of Boiling Point is faction relationships. In order to find information regarding his daughter's disappearance, Saul must work with and against various factions, completing objectives to improve his stature. According to Zabaryansky, there are some 400 missions in which to do this.

'Performing the missions changes the relation parameters: if you perform a mission for the officials, the relations with them and weapon handling parameters will improve, but the relations with the faction against whom you perform this mission will drop,' he says.

'So before you mess about in your adventure [you need to] think carefully about whether it is going to effect your previous progress – the game is non-linear and you may finish it in many different ways, playing many different roles.'

Zabaryansky mentions that there's a great deal of variety in the missions, with tasks ranging from cargo transport to sabotage, delivering medicines and plain old carnage.

If the plentiful selection of guns wasn't enough, Boiling Point provides the player with numerous ways to upgrade their weapons. Faster fire rates, quicker reload times... whatever tickles your FAMAS.

Although there is some freedom as to who you side with, sticking with just a single faction may hinder your efforts.

'It may happen that an enemy faction has got the information you need – you may get it by bribing or trying to take a mission for this faction and improve the relationship,' Zabaryansky says.

'Thus, shifting around the factions in the game will get you the information piece after piece – as the result you will get the understanding of the whole situation which caused the disappearance of Saul's daughter.' Ultimately, Saul will make as many friends as he does enemies, however Zabaryansky admits a persistent, patient player can make everyone happy if they so choose.

At a basic level, faction relationships influence which NPCs attack you in-game. On a more complex level, they alter the cost of resources, access to those resources and mission availability. For example, if the player develops a bad relationship with 'the officials' they will be confronted at roadblocks and will have to find alternate routes. As a consequence, Zabaryansky says that the game has a lot of playability, as siding with different factions opens up different missions and areas.

Of course, going hand in hand with the faction relationship system is the AI.

'Different factions have their own tactics for combat, hiding, surrounding or simply attacking.' Virtual hearing and sight are also calculated for each NPC, so if you get spotted, you can be sure you'll be dealing with more than just the guy (or animal) who noticed you.

Wide load

The technology behind Boiling Point is three years in the making. 'Starting with the Vital Engine ZL 1.0 from Codename: Outbreak, the engine has evolved to this second version. At the same time, gameplay content and RPG elements were developed in parallel,' explains Zabaryansky.

Vital Engine ZL 2.0 is very tasty considering its origins. Along with support for DirectX 9.0 – on which the graphics subsystem is based – the technology boasts seamless loading of content, a physics engine similar to Havok and full vehicular mechanics. While Zabaryansky admits that having graphics comparable to normal-mapped extravaganzas like Doom 3 was not a focus, the engine does an excellent job of immersing the player, making use of version 1.1 pixel shaders. Zabaryansky says this should guarantee compatibility over a range of cards while still looking great.

The seamless loading is thanks to the tile-based nature of the engine. 'Each tile is a 200 x 200m part of the terrain. We have about 200 tiles on our game world – some are general roads, some are unique locations for a scenario.'

'We just used old ideas in innovative ways – I have not seen any games where you can actually walk in 3D inside tiles.'

As the player moves around, be it inside or outside, all the required tiles are cached in the background, leaving the user oblivious to area loading. 'There is no "Loading..." message while playing, except when starting a new game or loading a save,' says Zabaryansky.

Choices, choices

Boiling Point is one of a few titles now that has taken a lightweight genre, like the first-person shooter, and added deeper elements to extend the experience and draw in new players. It's a great evolution in games development, beyond simply mashing two genres together and praying the result will sell.

'In this way, we have achieved a unique gameplay by taking the best elements from RPG (scenario, dialogues, character abilities, missions, achievement of a global goal via completion of small ones) and FPS (realtime combat with enemy characters while completing missions). Now add a seamless world and the ability to drive various vehicles. Imagine all this in full 3D, and you'll understand what Boiling Point is,' says Zabaryansky.

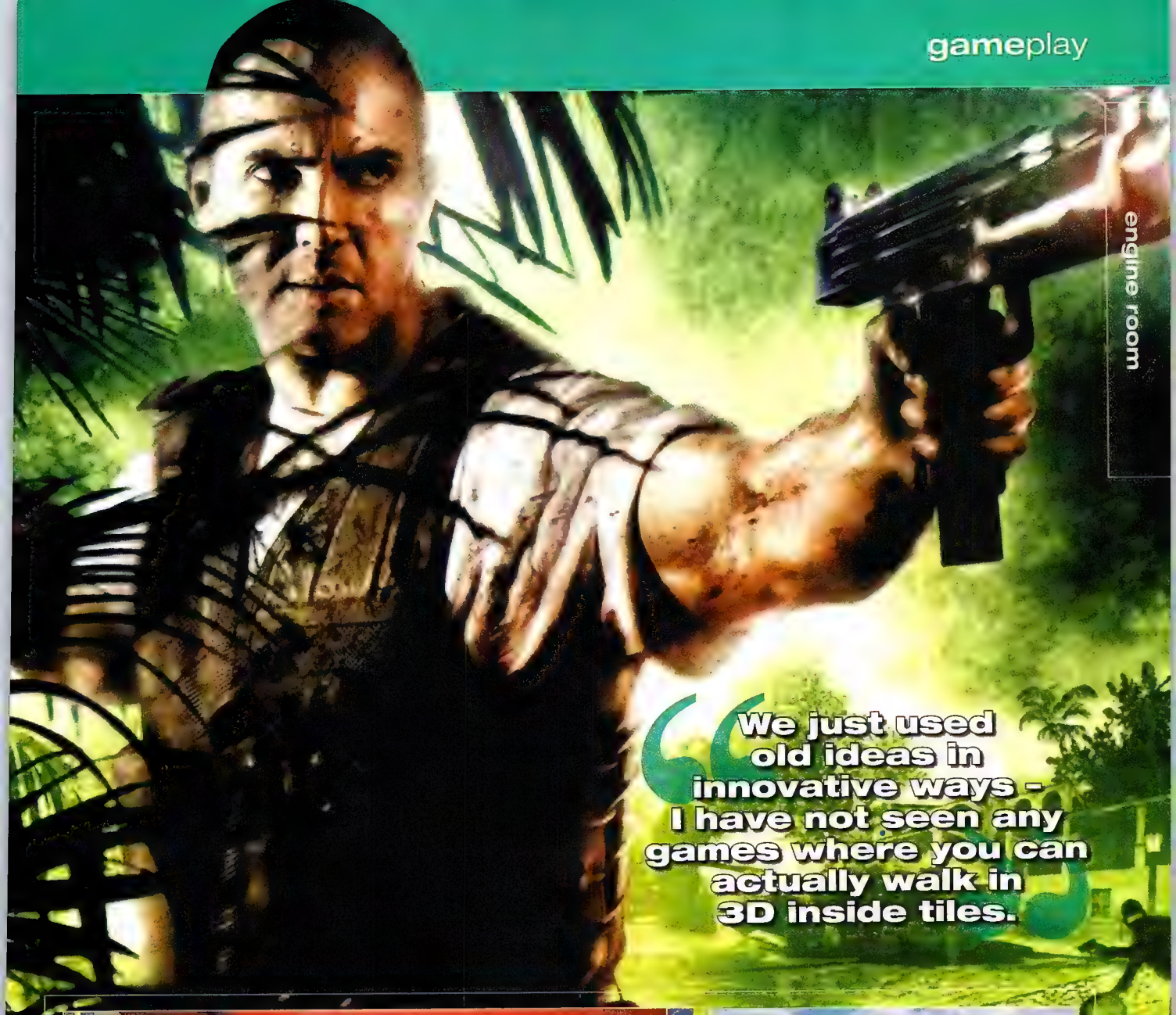
'We are already using the engine to create the Xenus add-on, and an already-announced title named "Precursors". However, Vital Engine ZL is constantly evolving, and could look totally different when the next title hits the market. Currently, the engine is only used internally, but there are options for licensing.'

Smart, it seams...

Now that the average PC sports 512MB-1GB of system RAM, and around a quarter of this amount in video memory, games that seamlessly load resource-heavy content are very possible. Developers have been doing it for years now with success, and many should remember seamless loading as one of Dungeon Siege's selling points.

Even so, modern titles like Boiling Point and World of Warcraft still need to have intelligent caching strategies to make the most of what system resources are available, as people still use PCs with 256MB or less RAM. In this case, game data will almost always be swapped out to the hard drive, and, because there are no major level loads – short of the initial one – it's up to the game's memory management code to load this data as best it can. Usually, this will result in a great deal of disk flogging as content is loaded and unloaded. For these types of games, a memory upgrade can provide more of a performance boost than a new video card or CPU.

Right now, engines capable of seamless content loading are in high demand for massively multiplayer and large-scale strategy games (and now shooters). Epic has started integrating support for seamless loading in its latest tech and eventually, ballooning memory sizes and 64-bit computing will leave developers with few excuses to not write games with little or no loading.



"We just used old ideas in innovative ways - I have not seen any games where you can actually walk in 3D inside tiles.

The great thing about Boiling Point is the ease in which it switches between its large, seamless world to the tight indoor environments. Just think of it: no loading or level changes, just continuous and relentless action. Oh, and all that role-playing stuff.

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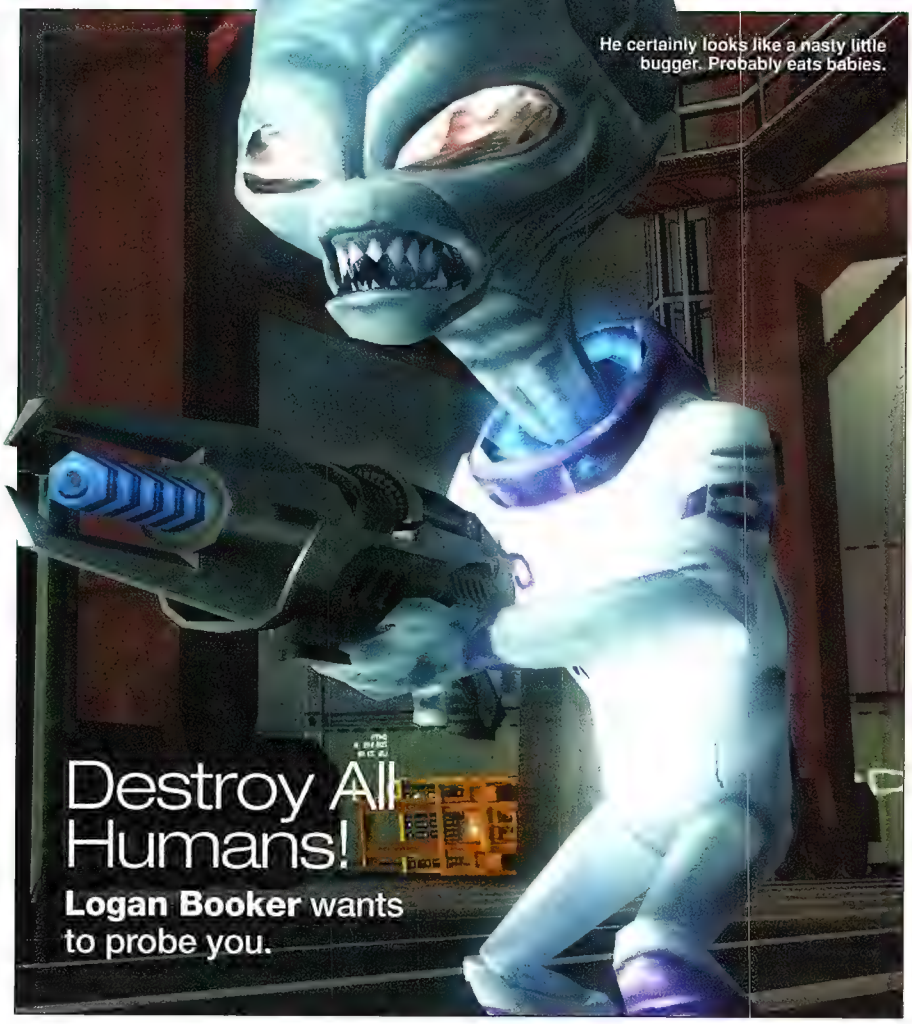


He certainly looks like a nasty little bugger. Probably eats babies.

Destroy All Humans!

Logan Booker wants to probe you.

Maybe it's because everyone's too caught up saving the world from Axis forces or sneaking into underground facilities and disarming nuclear weapons with a pair of socks and a toothpick, but there's a distinct lack of games that are just fun to play. You know, games that don't attempt to serve you dryly animated social commentary or embroil you in intrigue so dense there's a chance it'll collapse in on itself and create a joke-devouring black hole.

Destroy All Humans! pulls away from the current trend of realistic games with semi-believable plots and instead indulges in good old-fashioned satire. As wise-cracking alien Crypto-137, it's up to the player to salvage DNA from an unsuspecting Earth populace. Unfortunately – for humanity anyway – the only way for Crypto to extract DNA is by taking brain stems... and by insulting them with his Jack Nicholson-like personality.

The game is set in the 1950s, when aliens and flying saucers were prime fright material and hubcaps packed death rays. The humour comes in so thick and fast it eclipses the plot, itself ridiculous beyond the point of no return. It should come as no surprise then that Crypto's boss Pox, a floating holographic head, is voiced by the guy that does Invader Zim. So everything is right in the universe.

The game is separated into two modes: alien, where you play Crypto, and saucer, where you fly around. As Crypto, you have access to a range of powerful weapons, including the more serious Ion Detonator and Disintegrator Ray, to the silly Anal Probe and Zap-o-Matic. Also at Crypto's command is a bunch of mental abilities, allowing the little green-grey extraterrestrial to lift cars and propel them great distances, as well as read minds and implant suggestions. To help you assimilate, the player is provided with 'HoloBob' a device that lets you take on the appearance of a human. Certain parts of the game even require you to impersonate people – an early section of the game has you pretending to be the mayor of a small town, trying to convince residents that aliens don't exist.

While each weapon relies on a recharging battery or ammunition, Crypto's various brain abilities use Concentration. This resource replenishes quickly while in alien form, but drains slowly when disguised. Crypto can feed his depleting Concentration by reading the minds of humans around him.

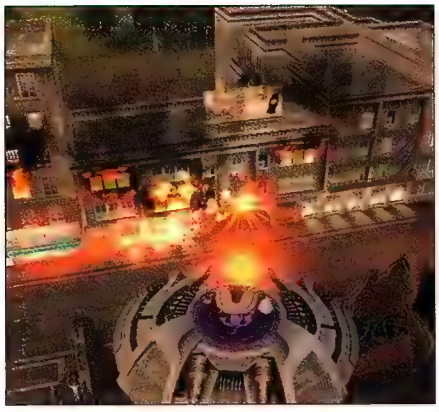
Mind-reading isn't all. By holding down the left trigger and targetting a human foe, you can pick a number of options like hypnotising, telekinesis and of course, brain extracting. With this formidable arsenal, the player is free to roam each stage, completing mission objectives and destroying the 1950s way of life.

Saucer mode on the other hand plays more like a sub-game. Once aboard, you'll spend most of your time levelling towns and obliterating tanks and gun emplacements. Otherwise, there's not much depth and you don't spend a great deal of time flying around.

The whole point of the game is fun, and stupid amounts of it. Running around reading people's minds is a sub-game in itself. Although the thoughts start to repeat themselves after a while, you'll be amazed at the number of unique ones you'll need to burn through before it gets to this point. Each level also has a few

PERIPHERALS FOR THE SERIOUS GAMER JOYTECH

Ion Detonator in action. Best used against the hapless.



new thoughts to read, which keeps things interesting, as well as special points that start mini-games, such as killing a certain number of females or meeting a quota of totalled buildings. Success awards the player with a large DNA bonus.

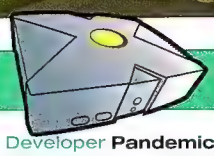
So, what happens with all this collected DNA? Between each mission you can spend it to upgrade your weapons and flying saucer. Telekinesis for example can be improved to allow the player to pick up vehicles, as opposed to just people, and the saucer's Death Ray can have its recharge time and damage increased.

Destroy All Humans! however is not perfect. Some of the missions suffer from AI problems. About a third of the way into the game you have to lead a government agent back to your spaceship. No matter how hard this reviewer tried, the guy would always run into an indestructible wall and get stuck. It was only by luck on the 20th or so try that he finally made his way to the saucer. Cars also seem to crash into each other for no reason, but it's mostly with the missions that the AI flaws present themselves and not general play.

The game also lacks some cohesion. All the over-the-top humour subtracts from the plot and the various play options feel like mini-games rather than solid mechanics. After a few hours of play, Destroy All Humans! resembles a piece-meal version of Grand Theft Auto 3, right down to the alert levels of various authorities.

All in all, it's a damn fun and funny game. While some of the humour misses the mark, the cheesiness is almost edible and it plays a lot like a series of disjointed mini-games, Destroy All Humans! is definitely a title you should spend some time with.


Some of Crypto's weapons can hurt hi as well as his enemies, so putting som distance between yourself and your munitions is recommended.



XBOX

Developer **Pandemic Studios**
Website **www.pandemicstudios.com**

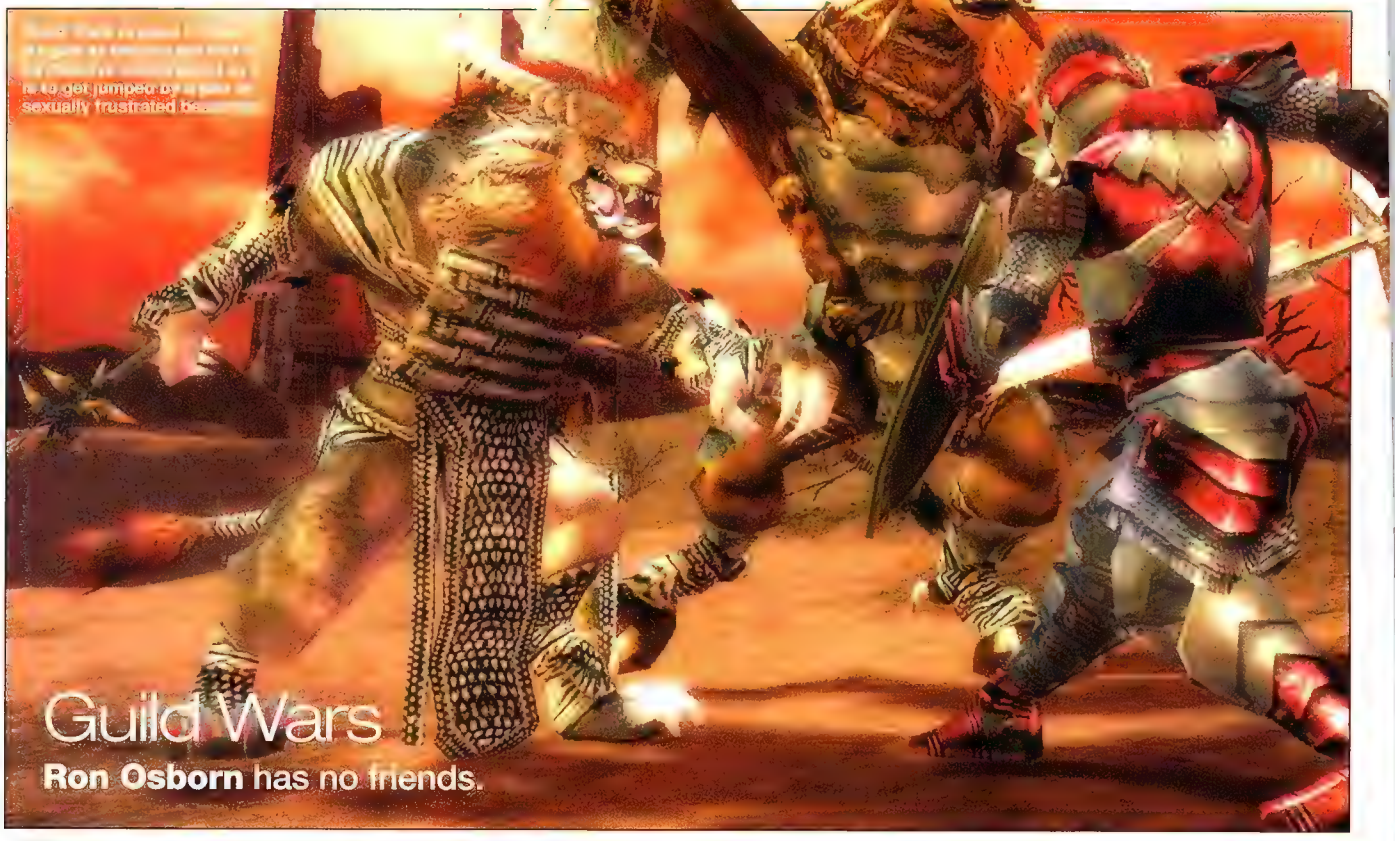
Players **1**
Other platforms **PS2**

VERDICT

Great visuals; variety of gameplay; saucer and alien modes.

Lacks cohesion; feels like a series of mini-games; AI problems.

score **8.5** OUT OF 10



Guild Wars

Ron Osborn has no friends.

There was a time when gamers gawked at the prospect of paying a monthly fee for a single game, but now the concept of a subscription-free MMORPG seems almost as crazy. However, Guild Wars developer ArenaNet has said that it aims to make money through the sale of content expansion packs. It's a smart move considering that most gamers are unlikely to spend the time and money on more than one MMORPG, but only time will tell whether or not this will work.

And time is something that Guild Wars won't steal away from you – at least not too much. Everything about the game is designed so that you don't need to devote the hours, days and even months of playtime to get somewhere – from the straightforward controls and interface to the relatively low level cap and single-click travel. Even logging out and shutting down the game is almost instant.

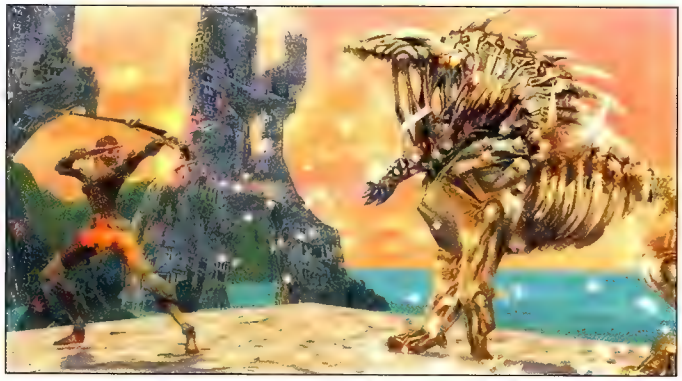
If all you're after is a quick fix of PvP, Guild Wars lets you create a fully levelled PvP-only character for tournament play. No more grinding to get to a PvP-ready level, though you won't be able to use this character in the normal game. Of course, there is some benefit to levelling up yourself; certain skills, for instance, only become available for use in PvP after you have unlocked them in the normal game.

Character creation can be daunting but the depth of customisation belies what is essentially a simple system. There are six classes (called professions) in the game, which comprise the usual assortment of healers, fighters and magic users. The twist in Guild Wars is that you actually get to choose two of these to create your character resulting in 30 unique character combinations.

If you've played any type of RPG, you'll be at home with the attribute point system. Conveniently, as you gain experience you also gain refund points that allow you to reallocate attribute points. This means you don't have to worry about making a poor decision when building up your character.

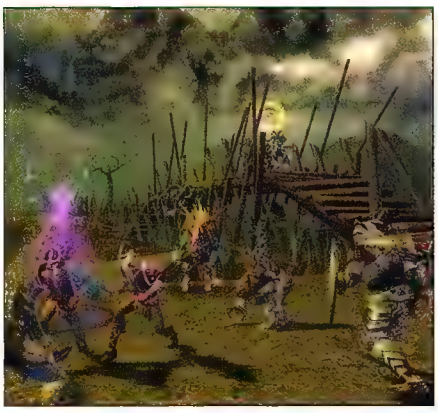
The visuals in Guild Wars are amazing, made even more so by the relatively low system requirements. Subtleties such as shadows cast by branches swaying in the breeze give the environments a realistic feel, and the detailed character models are as likely to influence your choice of professions as are the statistics.

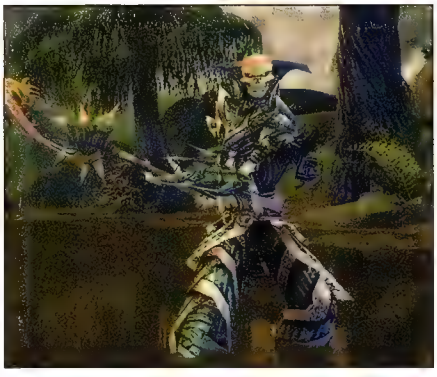
There is a trade off however. Movement around the environment is somewhat restrictive. You are unable to jump, or fall for that matter, and your character also has an aversion to deep water. Even the slightest ledges in the



PERIPHERALS FOR THE SERIOUS GAMER JOYTECH

Guild Wars is for the most part all about player-versus-player combat. And chicks in short leather skirts.





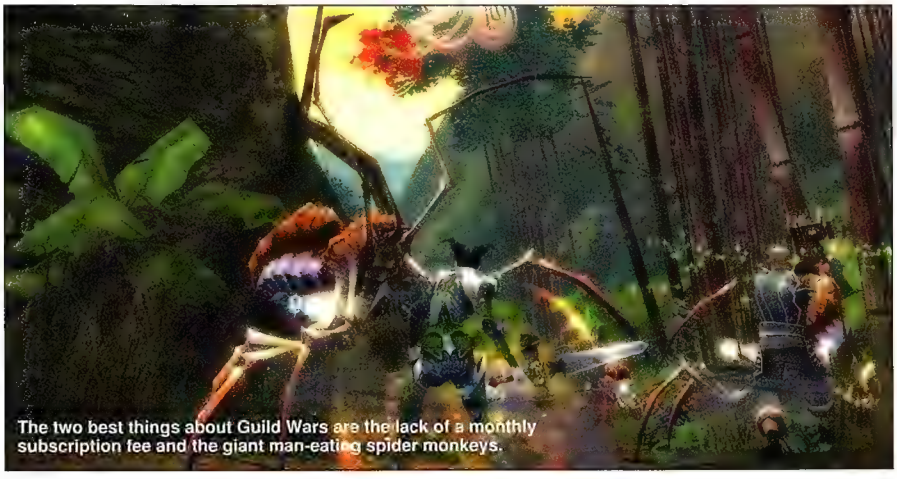
game have an unseen fence that prevents you from falling or otherwise jumping down. This can become frustrating at times, especially if the seemingly straightforward path between you and your destination suddenly turns out to be blocked by an invisible wall. With these impenetrable barriers around, you'll also find it's easy to get stuck between a rock and an invisible place. While it's not a huge chore to get free, it doesn't help the frustration factor.

One of the key features of Guild Wars is the lack of server segregation. Although you are automatically assigned to a server based on your location, you can easily switch to another from a dropdown menu. Essentially this means you're never short of other players to group with, which actually leads to the greatest irony in the game: Finding a group is actually quite difficult.

Towns are the only place in the game where you will encounter other players outside of your own group. When you venture out into the game world, a unique instance is created for your group, even if that group is only you. Though this does stop camping and kill stealing, it does mean that when you get to a town, it's usually crowded. With so many players, and so much noise in the general chat, it can be quite difficult to find suitable players to quest with. Fortunately, if you are in need of some extra firepower for a particular mission but you can't round up some human allies, you can hire NPC henchmen to complete the task.

Hopefully an easier way to group will make its way into a patch in the near future. The game has been frequently updated since release which is an encouraging sign of the developer responding to player feedback.

The lack of investment in both time and money that is required to play Guild Wars is both a plus and a minus. It's not going to replace EQ or WoW, but then again it isn't designed to. It'll sit happily beside your current MMORPG of choice as a fun 'second' game and if you've yet to be exposed to the world of MMO gaming, this is a great initiation. There are still a few rough edges but with regular updates and future (paid for) content chapters in the works, it looks like ArenaNet has a real winner on its hands.



The two best things about Guild Wars are the lack of a monthly subscription fee and the giant man-eating spider monkeys.

PC

Developer **ArenaNet**
Website **www.guildwars.com**

Recommended
1GHz CPU; 512MB RAM; 64MB graphics card; 500MB HDD.

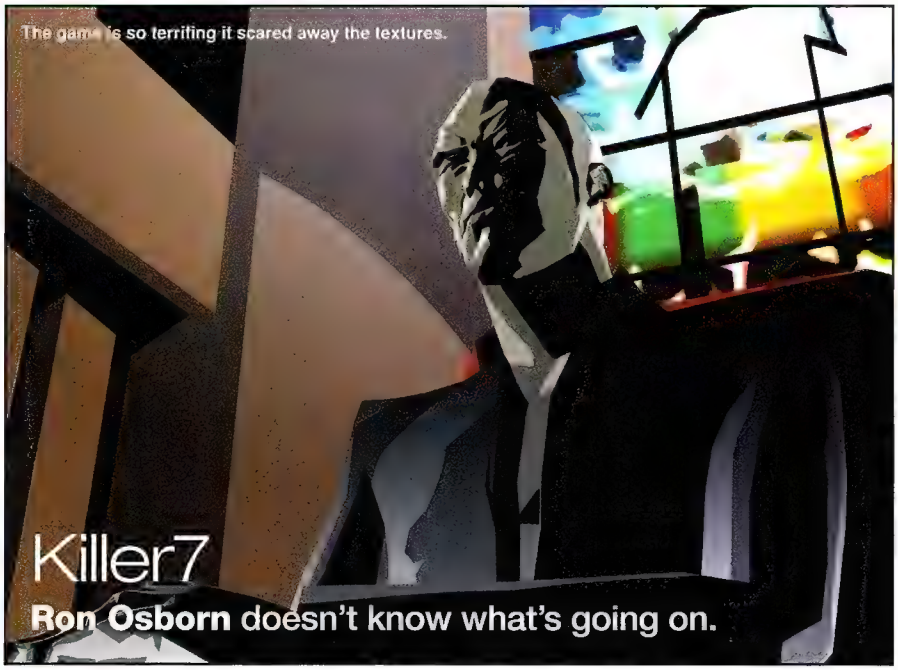
VERDICT

An MMORPG that won't drain your wallet or your time.

Still a little rough around the edges; finding a group can be difficult.

score **8.5** OUT OF 10

PERIPHERALS FOR THE SERIOUS GAMER JOYTECH



Killer7

Ron Osborn doesn't know what's going on.

There's something not quite right about Killer7. Perhaps it's the reaping of blood from enemies and giving it to the doctor who lives in the TV; or maybe it's the save-game maid who enjoys shagging wheelchair-bound old men. Come to think of it, there are a lot of things that are not quite right about Killer7, but somehow it works – and it works well.

Anime weirdness is riddled throughout the game like parasitic worms playing twister in your small intestines. You play Harman Smith, a 65-year old crippled assassin who can mysteriously shapeshift into one of seven personalities. Your enemy: an invisible cult of extremists known as Heaven Smiles who'd like to greet you suicide bomber-style.

Each of the Killer7 team has a unique ability from performing wrestling moves, to slashing wrists in order to break down barriers using a fountain of blood. Though you'll no doubt find a favourite among the seven, you'll need to use each member's abilities in order to progress through the game.

The game is played from a third-person, survival horror-style perspective. However, when you hear the evil laugh of your invisible enemy, you'll need to switch to first-person mode where you can use your special see-the-bad-guy ability and more importantly, your gun. Thankfully the Smiles can't shoot back, because you can't dodge.

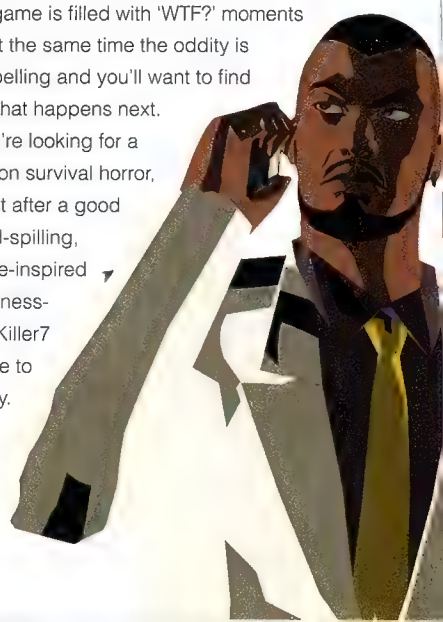
Movement in the game is restricted to running in a straight line but the camera movement around your character makes the game feel more like an interactive Anime movie, distracting you from the limitation.

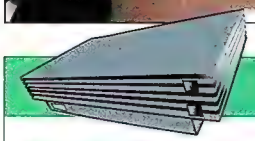
The only real flaw in this artistic control system is that although you move in a straight line, enemies can come at you in all directions and turning around in first-person mode isn't exactly quick.

While this general 'run-forward, shoot-things, run-forward' formula is used throughout the game, surprisingly it doesn't get old. There are always enough little puzzles or twists in the plot that make you want to push on that little bit further.

The puzzles are quite typical of Capcom survival horror games and fans will find some comfort in the familiarity. One of the benefits of the game being so linear is that you never miss anything critical to your progression. Even if you get stuck on a crucial puzzle, you have the option to buy help. The emphasis is unraveling the story rather than retracing your steps.

Killer7 is gaming's answer to *Pulp Fiction*. The game is filled with 'WTF?' moments but at the same time the oddity is compelling and you'll want to find out what happens next. If you're looking for a twist on survival horror, or just after a good blood-spilling, Anime-inspired weirdness-fest, Killer7 is sure to satisfy.





PS2

Developer **Capcom**
Website **www.killer7.com**

Players **1**
Other platforms **Gamecube**

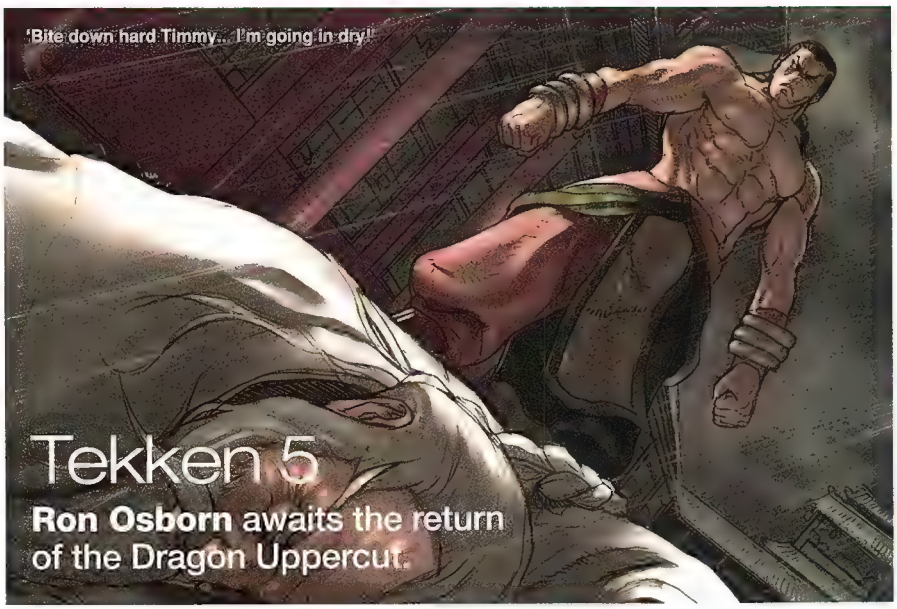
VERDICT

Anime inspired gore and weirdness; compelling plot twists and puzzles.

Linear movement can be limiting; action tends to become repetitive.

score **8.0** OUT OF 10

PERIPHERALS FOR THE SERIOUS GAMER JOYTECH

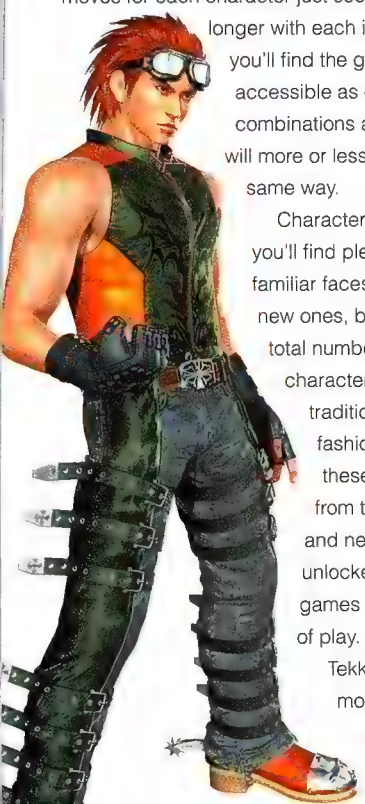


Tekken 5

Ron Osborn awaits the return of the Dragon Uppercut.

Tekken 5 can be summed up in two words: It's Tekken. Everything that you loved about the previous games has been wrapped up, refined and perfected in what is essentially the video game equivalent of a Greatest Hits album. You even get the last three Tekken games included in the package; so if for some inexplicable reason the series has eluded your attention for the best part of the last decade, you can catch up on what you missed out on.

The fighting system is as good as ever, with the perfect blend of button-mash simplicity and strategic depth. Though the list of special moves for each character just seems to get longer with each iteration you'll find the game is as accessible as ever and old combinations and tactics will more or less work in the same way.



Character wise, you'll find plenty of familiar faces plus three new ones, bringing the total number of playable characters to 31. In traditional Tekken fashion, not all of these are available from the outset, and need to be unlocked through the games many modes of play.

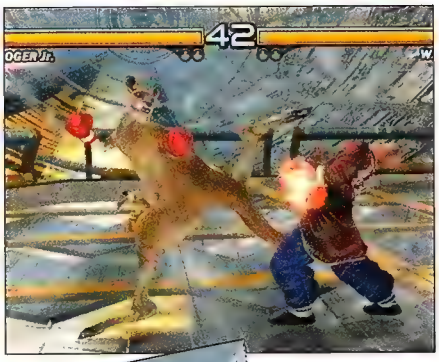
Tekken Force mode, the side-scrolling beat-em-up from previous games has been replaced this time around with Devil Within mode – a rather plain 3D beat-em-up featuring Jin Kazama. It's a fun distraction, but gets repetitive very quickly.

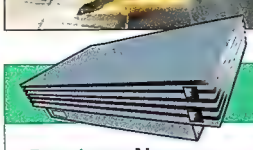
The main story mode is well-presented and follows your character through the King of Iron Fist tournament with a slick combination of anime-styled cutscene stills, in-game sequences and rendered video footage.

As is to be expected from the genre, the visuals are damn hot. Tekken 5 is one of the best looking games we've seen on the PS2. Fluid animation combined with meaty sound effects gives the game a satisfying oomph. Details in the various stages, such as the clink of loose change as you knock your opponent around an arena covered in doubloons, also add to the atmosphere.

New in Tekken 5 is the ability to customise each character by earning money from battles against AI opponents of varying skill levels. Though customisation is purely aesthetic, it does add to the longevity of the game and is sure to be a hit with die-hard fans.

The only real problem with Tekken 5 is that it's Tekken. Despite slick presentation and minor refinements to the rock solid game mechanics, this really is the same game we've been playing for the last bazillion years. It's the best of the series though, so if you're looking for the definitive Tekken game, or just need to fill out your Tekken collection, this is a dream come true. Though it does leave us wondering just where else Namco can go with the series. Let's just hope we don't see another Death by Degrees.





PS2

Developer **Namco**
Website **tekken5.namco.com**

Players **1-2**
Other platforms **No**

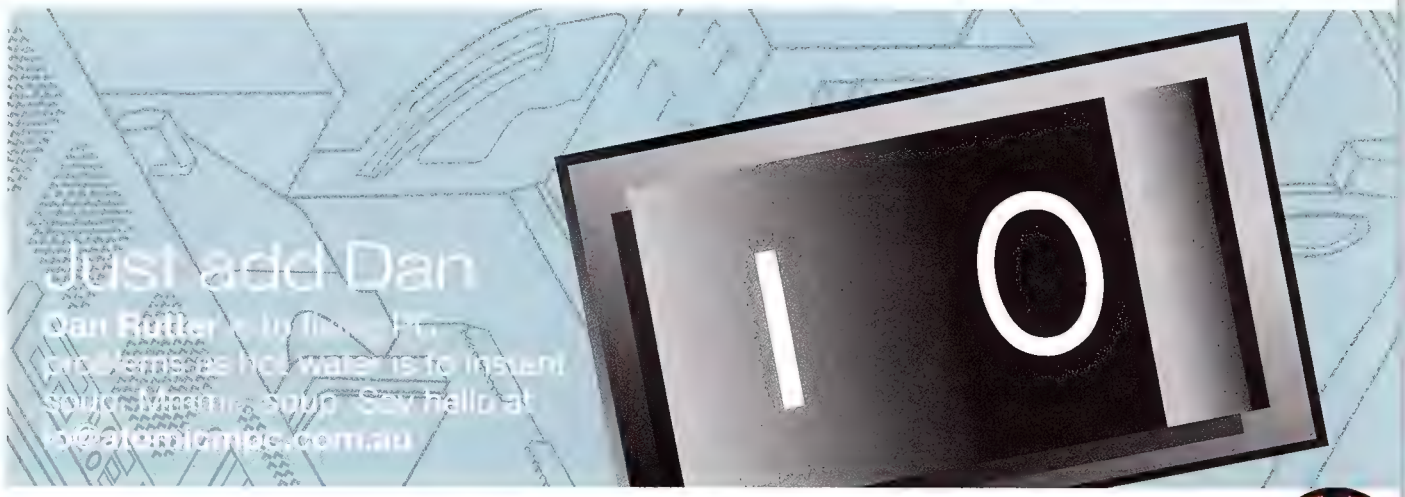
VERDICT

A Tekken fan's wet dream; Includes Tekken 1, 2 and 3.

Nothing revolutionary; How many more Tekken games do we really need?

score **8.0** OUT OF 10

atomic
PERIPHERALS FOR THE SERIOUS GAMER JOYTECH



Just add Dan

Dan Rutter [illegible]
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Little box, big noise

I seek your scholarly wisdom on the matter of replacing a somewhat noisy power supply in my dinky little Athlon powered shoebox – otherwise known as a Shuttle XPC SN41G2.

The power supply has a small fan, which spins fast and makes a bit of noise. I was thinking that it may be feasible to rip it out and hack together an external power supply from a couple of power bricks or something.

The only complication I could see would be getting DC power bricks that can supply enough power. The current power supply is supposedly 250W... but I think that might be more than a little marketing mumbo.

In my brief research I couldn't find a power brick that came close to matching the maximum power rating (of each individual rail) of my current PSU. Is the idea of running a PC off a couple of power bricks plausible (and not going to cost a fortune)?

Ian Griffiths

Even in these days of lightweight couple-of-amp switch-mode wall warts, it's still not practical to run any normal PC hardware from plug packs. Quite apart from the fact that you need multiple voltages, you just won't be able to get the necessary current out of plug packs, as you've noticed.

There are two ways you can go here.

Option one: Change the ventilation. The SN41G2, like various other Shuttles, is cooled by two exhaust fans – the PSU fan and the 80mm unit on Shuttle's clever rear panel heatpipe CPU radiator thingy. You can't just unplug the PSU fan or the power supply will overheat; you *might* be able to speed-control the PSU fan into quietness (it'll be a 12V unit – usual warnings apply about opening the PSU) without causing problems, but then the thermally-controlled main fan will probably run louder, and you'll have gained little.

You could, however, jigsaw a big old hole in the top of the case and put a 120mm fan on it. Speed-control *that* fan to near-silence, and a slow or removed PSU fan should be OK. Slow 120mm fans are very quiet, especially when they're intake fans.

Option two: Change the PSU. The FN41 motherboard in your Shuttle, like all of their 'full-power' hardware, can run from a standard ATX12V PSU. The super-quiet full-sized PSU of your choice will run your little computer just fine, and the Shuttle's standard 80mm fan will keep it cool.

If you do the 120mm fan thing as well as go to a full-sized PSU, you may be able to do away with the 80mm fan too. You could also try using the big PSU's fans to move air through the case, with a duct or just by cutting a hole and attaching the PSU to it.

Paper clips and gaff, mate

I've just added a Mac Mini alongside my Windows box. I'd like to pipe the sound for both boxes through my speakers.

Currently I have the Mac's stereo output going into my M-Audio Revolution 7.1 card's line in, which then gets piped through to the speakers. The biggest problem with this arrangement is that the M-Audio card's line in is kind of noisy. This is a pain at higher volumes, or when I'm using headphones.

I'd like to connect both the Mac and the Windows box directly to the front speakers at the same time. I'm not above splicing something together – I've certainly handled a soldering iron, and even a few simple ICs – but I wouldn't turn down an off-the-shelf solution.

Matt

IOOTM wins a Logitech MX518!

[illegible] than a bevvy of South babes, the MX-518 is a gaming mouse fit for a king

The simplest way to do this, as employed by 90 percent of teenagers with a collection of audio gear to connect together, is to just use Y-adaptors. This is a bad solution, because unless everything's turned on all of the time (and possibly if it is), you'll get impedance mismatches, probably producing a low audio level. You compensate for that with more volume then turn something else on, and everything will get really loud.

When teenagers tire of this, they generally buy a cheap mixer from their local 'So You Think You're A DJ But You've Only Got A Hundred Bucks' place. This works much better, but cheap mixers invariably have lousy signal-to-noise ratios. They're actually pretty adequate for band use in your garage (especially if it's a punk band), but if you're noticing sound card input noise now, you'll definitely notice cheap mixer noise.

Low noise mixers are much more expensive, and overkill, because they all have far more than the few channels you need. There are two and three-channel low noise mixers designed

Fortunately, it's not just one or the other.

for mobile recording applications, but they're even *more* expensive, feature-for-feature. It's ridiculous to buy a thing like that when all you actually need is a Y-adaptor with no impedance mismatch problems.

The solution is a *passive* mixer, which splices the signals together through impedance-matching resistors. Passive mixers are simple and cheap, need no power supply, and *can't* introduce any noise of their own – well, unless they have noisy level potentiometers, and even then you'll only get noise when you're moving the knob or slider.

On the downside, passive mixers eat some signal, so you'll need a higher volume setting. This is seldom a problem for line level sources like computers – modern computer 'line level' outputs can pretty much all deliver a clean signal at more than line voltage, because they have to be able to drive headphones.

Many passive mixers are mono units made for instruments and mics, but it's not hard to find stereo units, and RCA connectors can be had, too: **tinyurl.com/avgal**. And yes, you *can* make your own; it's especially easy if you don't need any level adjustment.

Not snake oil, for once

I know you like debunking miracle devices so I just wanted to find what you think of these: **tinyurl.com/7eshm** and **tinyurl.com/auoss**

These are just some sites I Googled when I learned that someone I know was interested in selling something similar.

Mark

These things are power factor correctors, which are pointless for home use.

The Mini Sun thing is so small that it can't do much of anything; the Legend Power product is a big expensive commercial unit.

Power factor correction *will* save you money, if you're billed according to your power factor and run hardware with a bad power factor. This situation is common for commercial power users, but pretty much unknown for domestic users, because although things like PCs may have a lousy power factor, domestic power meters don't notice it.

PFC will not, however, generally make lights or motors run better, as is sometimes claimed. It'll improve the (typically very bad) power factor of underloaded motors and make *them* run cooler, but your gear shouldn't have underloaded motors.

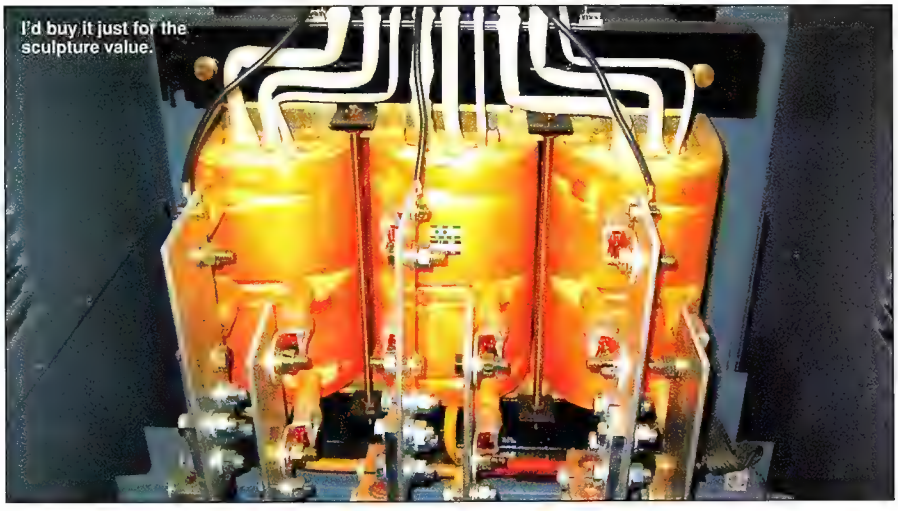
Motor power should be matched to the task, and a properly loaded motor typically has a very good power factor.

Also, a single device may or may not correctly compensate for the differently lousy power factors of the various devices on a circuit. It may make the total collection look better to the power company, but not make anything work better in the building.

The non-PFC portion of the claims for these devices has to do with surge and spike suppression, which they may well do. Once again, this is unlikely to make anything run better day-to-day, but proper power conditioning can make a huge difference if you live somewhere with unreliable and/or dirty mains power.

Once again, though, a small, light, cheap gadget is not a proper power conditioner.

I ramble on about PFC here: **www.dansdata.com/gz028.htm**


I'd buy it just for the sculpture value.

I/O OF THE MONTH

Eat your heart out, ZIP

In *issue 53*, it says that any file can be given a fingerprint using MD5 hashing. Would you be able to reverse this hashing system and, from 99b5d7befcadb501fe7568ed4e8f4c5, be able to create the original text file saying 'Yes Sir, Very Atomic!'?

Could this work on large scale, say hashing a 100MB file then posting this hash on the internet so people could download it and then recreate the file on their computer?

Stephen Tofler

Think of the output from a hash function as a label on the front of a drawer. In the drawer is any file that hashes down to whatever's printed on the label. The label doesn't tell you what's in the file, though; it's much too small to be able to do that, unless the file itself is trivially small. Which, in the case of the simple 'Yes Sir...' sentence, it actually is – but MD5 isn't trying to tell you what's in the file. It only wants to create a hopefully-unique drawer-label number for you.

The idea is that MD5 evenly, and unpredictably, distributes input files between all of those drawers, making it incredibly unlikely that any two will go to the same place. That's because although a 128-bit number can easily be written down (128 zeroes and ones, or the more common 32 hex digits; four bits per hex digit), it still gives an astounding, brain-bending, number of possibilities.

Two to the power of 128 is a really, *really* big number – roughly 34 followed by 37 zeroes. There's no way to make this number intuitively graspable. If, for instance, you had 2^{128} actual physical drawers, and you put them side-by-side, then even if the line of drawers reached as far as the most distant observable objects in the universe – quasars about 13 billion light years away – each drawer would still be less than one twenty-five-thousandth of the size of a hydrogen atom.

Or, to put it another way, if the drawers were made from the whole planet Earth, each one would weigh roughly one fifty-seven-billionth of a gram.

Interestingly, though, MD5 is *not* the perfect drawer-selector that it's meant to be. You can read more about its weaknesses here:

tinyurl.com/96A6P

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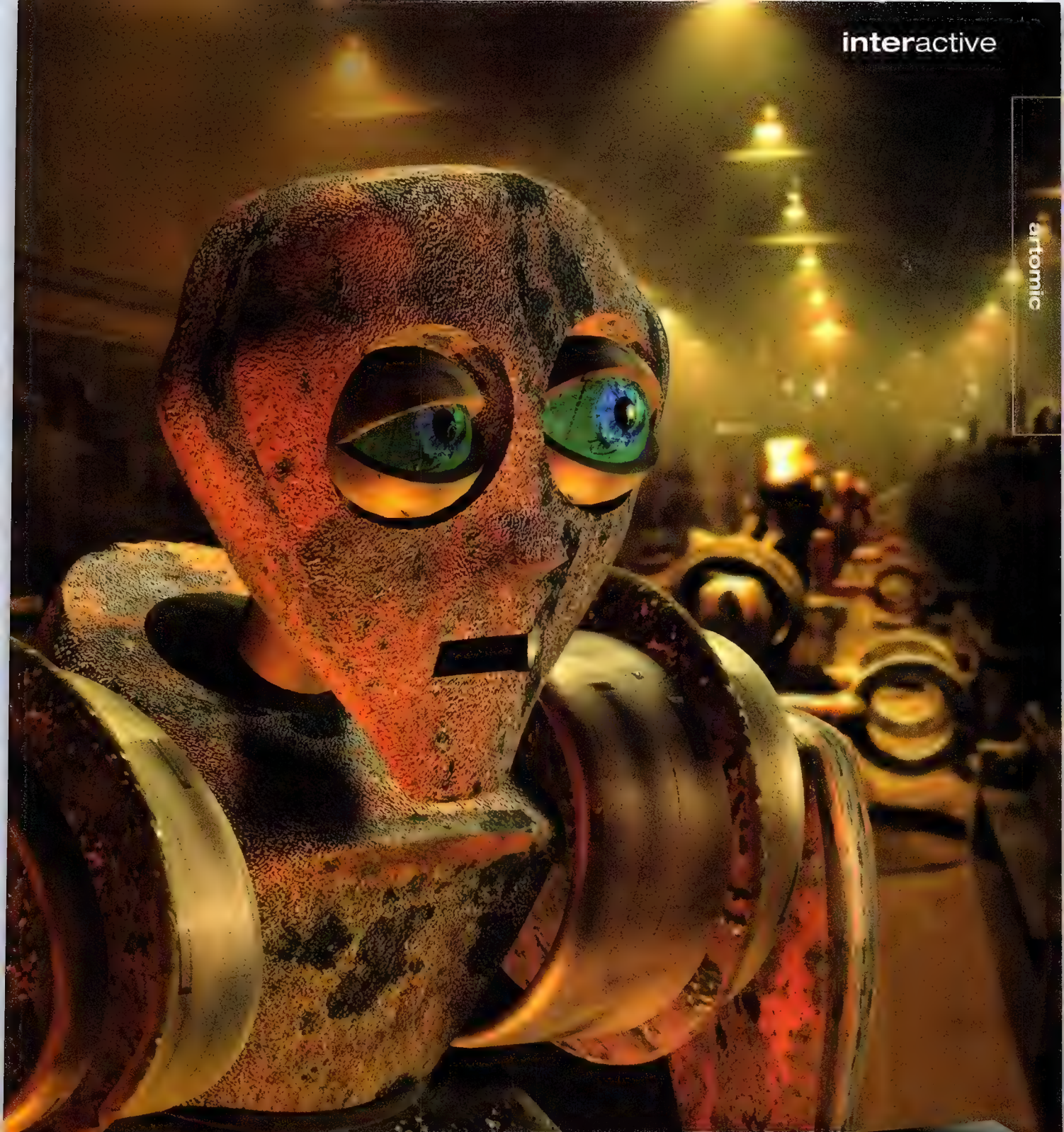


WIN! $1995 Combustion 3!

Here's my submission for Artomic – Robbie was made using primitives in 3ds max. Copies of him were added to a factory photo, then colour treated and various effects applied. Lighting took forever – all up there are 52 tinted spots!

John Simpson

Create the winning Artomic and win the latest version of Combustion, valued at **$1995**, from **discreet**!
Email a preview (no larger than 5MB) of your masterpiece to:
artomic@atomicmpc.com.au

hotbox

The best reader-submitted custom made boxes every month!

Welcome to Hotbox! Each month you'll find the winning Hotbox of the month and runners up as voted for online at **www.atomicmpc.com.au**. Want to win? Submit your box now!

John's Viper

The machine started life as an average midi-tower until I bought the MSI mobo. It had a chipset fan with flashing LEDs. I had to show it off (gives the kids something to look at). Then came the Thermaltake LANfire case which got replaced by the VIPER, with two 6in blue neons, a 12in blue neon, a 12in UV neon and three red LED spots which are hidden behind the front grill. For the moment this is my hotbox, but I work in the field so I've always got my eye on pricelists and new items from wholesalers.

John

technicaldetails

- Intel Pentium 4 3.0GHz
- MSI 865 NEO2 motherboard
- 1GB DDR400 RAM
- GeForce4 6600 video card
- 80GB Seagate SATA HDD
- Thermaltake 480W PSU

Cary's Timber PC

I wanted the case to look comparable to a piece of furniture and not like a computer. The power button and DVD eject button are dowel and the disc tray has plywood fixed to it so it blends with the rest of the case. The sides are pine and the base and brackets holding the HDDs and DVD-ROM are plywood. The lid is Perspex and an intake fan is included on the left side. Once the main parts were done, I routed out most of the hard edges and sanded everything to make it look more rounded. Overall I'm pretty happy with it. It looks neat and I managed to use the old components that were collecting dust.

Cary

technicaldetails

- AMD Athlon XP 1800+
- ASUS A7A266-E motherboard
- 512MB PC2100 memory
- GeForce3 Ti200 video card
- 2 x 8GB Western Digital HDD
- Mitsubishi 16x DVD-ROM

atomic hotbox OF THE MONTH

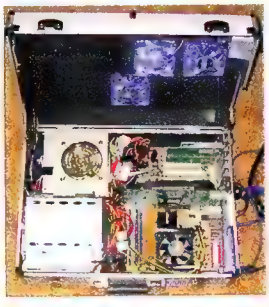
Vando's Briefcase PC

I was sick and tired of my old case so I decided to build myself a new one. The plan, to have a portable, original and awesome looking PC. I brainstormed a bit and came up with the idea of a PC in a briefcase. I searched ebay and found a cheap suitable briefcase. After a lot of work I had my PC running in the briefcase. I added some vents for cooling and lit them up with super bright blue LEDs. I then added 3 blue LED fans to keep it cool.

Vando

technicaldetails

- Intel Pentium 4 3.2GHz
- ASUS P4P800-E Deluxe
- 1GB DDR 333MHz
- BFG 6800U OC 256MB
- 2 x 160GB 7200rpm SATA HDD (RAID 0)
- 550W Antec True Power PSU



Fame, fortune, and free stuff can be yours! Send your Hotbox to hotbox@atomicmpc.com.au and include the following:

- 3-4 high resolution, well lit, pictures
- A 250 word description of how you made it, the obstacles you overcame, the tools you used, and your inspiration.
- A detailed list of the machine's specs.

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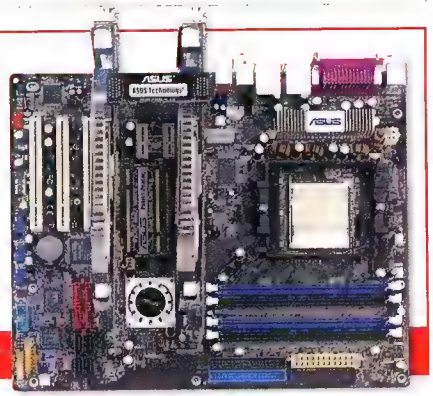
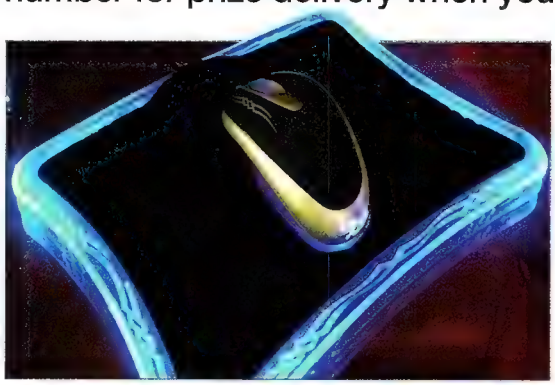


For the win!

To enter, go to www.atomicmpc.com.au/competitions. You can only enter once per competition or you'll be disqualified. You must provide a postal address and phone number for prize delivery when you enter (not a PO Box).



6x xRaider Flexiglow mouse pads

Mouse pads! Everyone needs at least one. Especially one that glows, considering all those crazy nocturnal activities we tend to get up to. If you're finding that your monitor just isn't doing it for you any more in the lighting department, then enter this competition to win one of six xRaider Flexiglow mouse pads. Cheers to the folks at Flexiglow (**www.flexiglow.com.au**) for these awesome prizes.

Q What happens to the compound zinc sulfide when it is exposed to UV light?

5x packs of Destroy All Humans! for Xbox + T-Shirt and soundtrack

Oh no! Aliens are attacking! Truly! Look outside, you'll see them descending from the heavens in their weird little spaceships, filled to the gills with ravenous mongoose dogs. What can you do? Join them, of course. Take this opportunity to nab yourself a copy of Destroy All Humans!, and you'll also get a T-shirt and a thumping soundtrack! All thanks to Ben at THQ (**www.thq.com.au**).

Q What is the name of the actor who voices Orthopox in Destroy All Humans! and what other fictional alien does he lend his voice to?

Atari Flashback game console

Console technology is progressing so fast these days. So fast, in fact, that one is wont to forget all that has come before. That's why it's great that Atari is going back to its roots, and has released the Atari Flashback gaming console. This 20-game beast has all the classics, from Asteroids to Breakout. Enter this competition and get back to basics – 16-colour style. Props to Atari (**www.atari.com.au**) for this terrific device.

Q Who developed the original 1979 version of Asteroids?

Email entries to **win@atomicmpc.com.au** or post them to: Atomic, 52 Victoria St, McMahons Point, NSW 2060. Please send a separate entry for each competition. Please ensure the competition name is the subject of the email, or is displayed clearly on the front of the envelope. The closing date for entries is 15 March 2005 Winners will be announced in *Atomic 57*

Atomic 53 winners: 5 x copies of Jade Empire for Xbox Q. What is the name of the priest in Journey to the West? A. Xuanzang. D. Eyde, Monash, ACT. A. Kwiatkowski, Perth, WA. B. Smith, Chapman, ACT. J. Leong, East St Kilda, Vic. B. McCombie, Mornington, Vic. 3 x Lasperpod and accessories + T-shirt and cap Q. Who invented the Laserpod? A. Chris Levine. R. Kinghorn, Walloon, Qld. J. Grant, Palmwoods, Qld. A. Tse, Randwick, NSW. 2 x Western Digital Passport 80GB portable drives Q. What purpose does the drive shaft in a car serve? A. It is the propeller shaft that transmits engine torque to the differential, or from the differential to the drive wheels. A Glissan, Oyster Bay, NSW. R. Schellenberger, Hurstville, NSW.

Terms and Conditions of Entry. 1. The promoter is Haymarket Media of 52 Victoria Street, McMahons Point, NSW 2060. Promotion period is from 9.00am on 13.07.05 until 12.00pm on 09.08.05. 2. Entry is open to residents of Australia and New Zealand. Management and employees of Haymarket Media and their immediate families, and any advertising, marketing or promotional firms associated with this promotion are not eligible to enter. 3. Enter by posting or emailing forms to Haymarket Media. 4. The draw will be held at the offices of Haymarket Media at 5.00pm on 09.08.05. Winners will be notified by mail and published in *Atomic* 57. The prizes are not transferable or exchangeable. 6. The judges' decision is final and no correspondence will be entered into. 7. The promoter reserves the right to publish the winner's name and suburb for promotional purposes. 8. All entries will become the property of Haymarket Media.

atomic 55
who would win a fight between MacGyver and Colonel Jack O'Neil?

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websight

Online, community, and making fun of stuff because we can

Trivial Geek Questions

Angus Kidman confronts the bald truth.

Welcome to Trivial Geek Questions, the advice column that recently spent an improbably large amount of time trying to decide what kind of car we were. Eventually, we realised that our lack of vehicular knowledge meant that we were never going to come up with a decent automotive analogy, so we decided to settle for being an invaluable source of advice for the geeky and confused everywhere. Submit your questions to **tgq@atomicmpc.com.au** or via the *Atomic* site.

Q: I've recently suffered from a major attack of thinning hair, making me look like nothing so much as a slightly better networked version of my grandfather. This wouldn't have bothered me particularly, except my girlfriend told me that it was probably due to excessive radiation from spending so much time in front of my PC. Could there be anything to this theory, or is she just being a pain again?

TGQ: The typical Geek Cliché 1.0 portrays us as overweight and with excessive amounts of hair in undesirable places, but TGQ is beginning to think this is not entirely representative. At a recent conference for professional geek types, we couldn't help noticing that every second speaker and every third attendee appeared to be suffering from pronounced male pattern baldness. Leaving aside the fact that women are still a rarity at this kind of event, could there be anything to the notion that too much keyboard time equals too few hairs?

We were unable to find any studies that directly addressed this crucial question, so at least we've now got a spare thesis topic lined up if we decide to become TGQ, Ph.D.

In general, baldness is still something of a medical mystery, but the most recent studies suggest that baldness is largely a matter of genetic inheritance.

Scientists have successfully isolated an androgen receptor gene variant that appears to trigger baldness in certain men. It may yet be that this gene is also associated with the ability to use a PC without panicking, though it will probably be some time before we know for sure as any scientist with half a brain will be too busy trying to patent the technology involved in making a KFC bucket full of cash.

Finally, two critical pieces of advice for the recently challenged of follicle. Firstly, don't be tempted to try the dreaded comb-over, even in an ironic way. When you only have four strands of hair left, it's better to accept the inevitable.

Secondly, don't go around wearing T-shirts with allegedly witty slogans like 'It's not a bald spot – it's a solar panel for a sex machine.' Chances are if you find this amusing, you're doomed to having no love life whatsoever.

A better strategy might be to follow the example of bald man and tattooed freak Brent Moffatt, who recently sold off a permanent tattoo on his forehead as an advertisement for an online casino. Sure, he looks ridiculous, but at least he's getting paid for it.

Brent Moffatt: scalp for rent to highest bidder, piercings a free bonus.

atomican

www.atomicmpc.com.au

Humans pride themselves on being individuals – even though the latest research shows that what Homo Sapiens do best is herd together in large throngs doing pretty much the same thing at the same time.

You see evidence of humanity's weird herding compulsion every day in the *Atomic* Community Forum (**www.atomicmpc.com.au/forums.asp?s=1&c=5**).

For example, it may be the middle of winter, and Canberra may be colder than an Eskimo hooker's teat, but Tin Reaper is organising an *Atomic* tent weekend on the Naas River flood plain. Brave intending Atomicicles can sign up at **forums.asp?s=1&c=5&t=1174**.

Another herd of Atomicans, led by Felipe, is hunting for a Sydney watering hole big enough to accommodate *Atomic* M33T v5.0. While few can recall what happens at these events (some kind of mutual morning-after memory loss, apparently) those wanting to join the stampede can head over to **forums.asp?s=1&c=5&t=1131**.

The biggest mass-migration of Atomicans each year is the traditional celebration of *Atomic*'s birthday. The cheeky Brisbanites have stolen an early march on their southern *Atomic* siblings by announcing an *Irradiate*^{2} event in January 2006 – even though some Sydney-siders reckon it's their turn to host the horde.

Meanwhile, rumours abound on the darknet that a cadre of Canberran Atomicans may be secretly planning a celebratory assemblage in the ACT.

Whatever happens, and however many birthday m33ts there eventually may be, one thing is certain... Atomicans will be there in number. And you can never have too many Atomicans. Ever.

– Virt

potm

We turn to community joy this month, and embrace the creative dynamism and have-a-go spirit.

Slamming to the top of the charts this month is **Nightbabe** with:

ZOMG IT IS ATOMIC!!!!!!!!111!!!
www.atomicmpc.com.au/forums.asp?s=1&c=1&t=64676

Putting Atomican avatars to dance music is crazy kaleidoscopic genius. Nice work Nightbabe, here's an MX510 all for you.

fallout

Funnies and humour from the fallout zone

Changing teams

It's official: **John Simpson** is batting for the other team.

Now before you go all PC on me and tell me there's nothing wrong with that, I feel I should explain why I decided to jump ship. Despite what you hear from a lot of people, it isn't something that suddenly hit me, and it certainly wasn't something I was born with. It was more like a gradual slide, when I started questioning certain things. Frankly, I got fed up with the game playing. And the trouble with my memory. And the heat whenever I pushed too hard. Yeah, the heat – I can't tell you the number of times I had to blow off steam after a particularly hard session...

So I did it. I bought AMD. And I'm not proud.

After years of being a staunch Intel Inside guy, I dumped the blue men in favour of the peculiar green triangles. It was like disowning a relative and adopting the school loser who everyone said would end up on the dole or joining the Democrats. I felt like I'd abandoned the cause, even if that cause was to bump up an already over-inflated share price by a fraction of a cent. Intel bosses were probably not going to be able to buy that third Learjet, and it was my fault.

It's a weird feeling, changing camps. Like when you decide never to go down the Woolies confectionary isle again, after noticing the buttock spread each time you sit down. It wasn't a decision I came to lightly, after spending months researching and trawling; reading review after review of AMD's better gaming performance; and the fact that Intel chips were now being used to power steam turbines in a number of small European countries.

Despite what you hear from a lot of people, it isn't something that suddenly hit me, and it certainly wasn't something I was born with.

Anyway, the new PC arrived in a big brown paper box last week. I felt dirty signing for it, and it didn't help that the courier girl kept giggling at me. I handed back the receipt and told her it was just for the articles. I then went to put on some pants.

There are some things I miss: the Intel Application Accelerator, that little program that seems to do bugger all and needs updating every other week. And the nights sitting around the PC, using the glow from the heatsink to toast marshmallows. Sure, the AMD machine came with HL2 and a damn fine framerate at 1900 x 1200, but these are only fleeting joys once the wife realises the late nights at my desk aren't adding to the bank balance.

Yeah, I know. Be happy with what you have, you say, particularly if it's an FX-55 with 2GB of RAM and two GeForce 6800 Ultras in SLI mode. My mum's always telling me there's nothing wrong with changing brands, especially if one brand chafes. She's always been an advocate for sampling the grass in the other field.

So if you've been thinking about climbing the fence, changing the wheel, or crossing the channel, my advice is: just do it. Hell, the worst thing that could happen is that you'll loose a little respect from your computer dealer, or get laughed at by the courier girl. They don't realise that, what it all comes down to, is being comfortable with your choice.

And there's nothing wrong with that.

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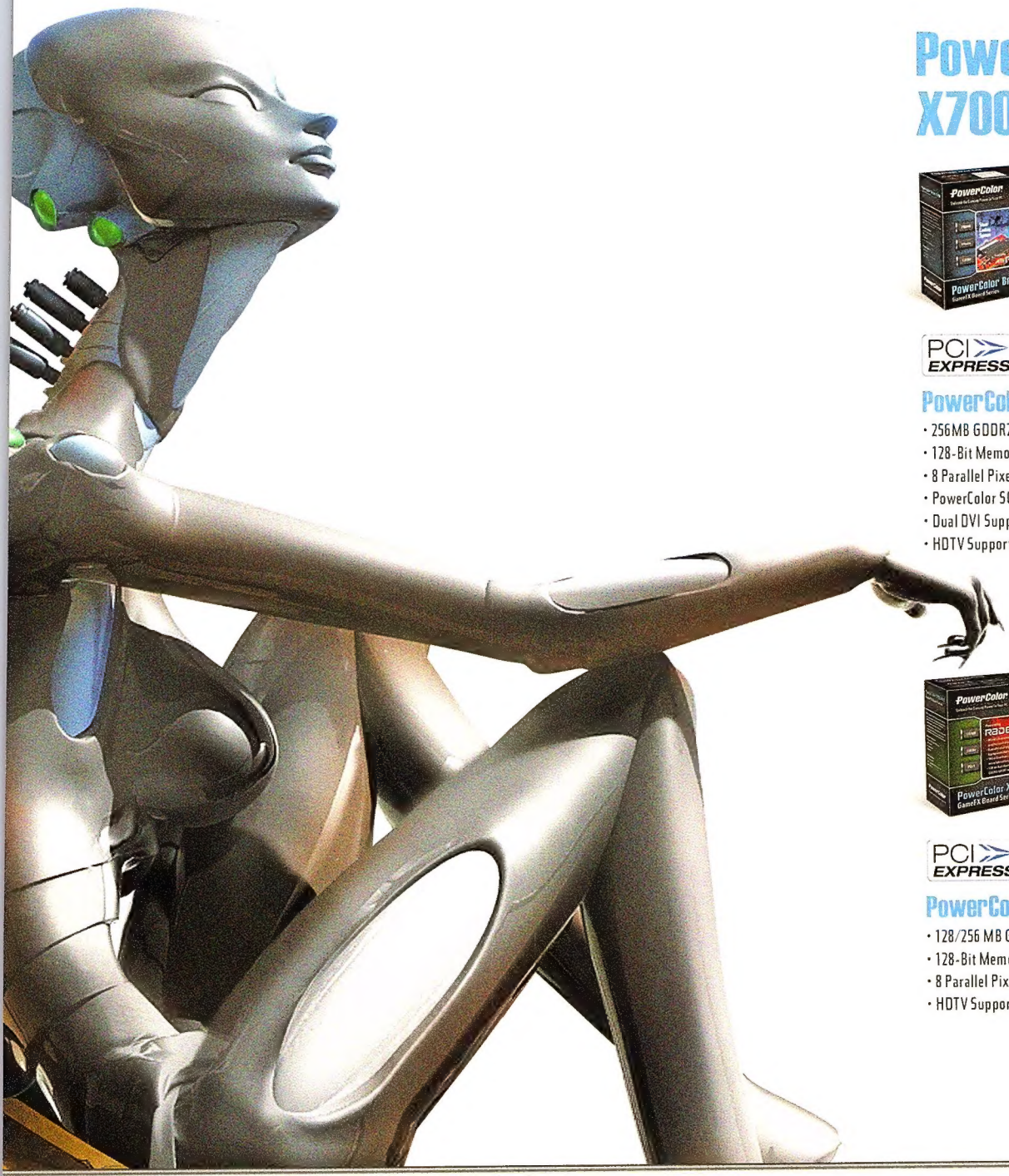

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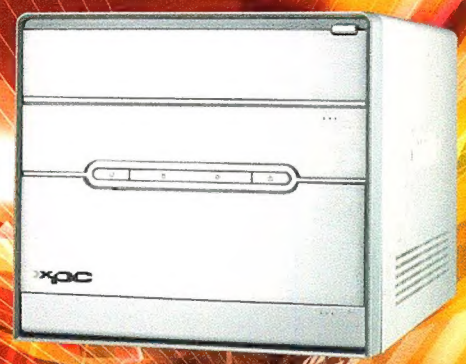

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